THE USE AND EFFECTIVENESS OF BEHAVIOURAL MODIFICATION TECHNIQUES IN ACHIEVING AND MAINTAINING NORMAL WEIGHT AND FITNESS – THE LIFESTYLE CHANGES FOR ADULTS IN CYPRUS

A PROJECT SUBMITTED TO MIDDLESEX UNIVERSITY
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF
PROFESSIONAL STUDIES

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PART I (A)

APRIL, 2011

The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight And Fitness – The Lifestyle Changes for Adults in Cyprus

A project submitted to Middlesex University in partial fulfillment of the requirements for the degree of Doctor of Professional Studies

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April, 2011

ACKNOWLEDGEMETS

To complete a joint Doctorate while working full time in demanding jobs it was really very challenging but on the other hand fulfilling of our educational and professional goals. We believe that the Work Based programme offered by Middlesex University was an ideal choice for our academic and professional advancement as it allowed us to study in depth scientific disputes within our professional setting.

We realize that we could only be successful with the support and encouragement of people around us. We would like to give special acknowledgement to some people who have provided this support over the last four years.

Dr. McRoy Ian and Dr. Menelaou Niki the advisors and Dr. Hadjigeorgiou Fotos the consultant, of this project provided an immense amount of encouragement and advice and always gave comments and feedback in a very encouraging and positive manner.

Special acknowledgement to the Cyprus Dietetic and Nutrition Association, the Registration Board for Dietitians and the Ministry of Education and Culture for being our Stake holders. Furthermore they added their endorsement to our research and their support by not only accepting to use the final outcome of this project (Manual/ Protocol and Guidelines) but also promote it to the professionals in Cyprus.

Prof. Gibbs, Dr. Savvas Kontos, Mrs Lazari Anna, Mrs Baily Veronica, Mrs Neokleous Eleni provided the stimulus and resource to complete the Doctorate programme and we would like to thank them for their support, encouragement and direction during our studies.

Special appreciations are made to our statisticians Elina Simeonidou and Christoforos Christoforou for their continual guidance and valuable contributions.

Finally, none of this would be possible without the support and understanding of our families, parents, husbands and children. They had to endure our studies over the years and at all times were understanding, encouraging and supportive.

Even though a joint project at many times it seemed very demanding our cooperation and commitment had an impressive effect on our performance. We believe as an effective team we managed and achieved incredible outcome for our profession.

The completion of the Doctorate in Professional Studies completes our personal, professional and educational goal that we both have carried ever left university and returned in Cyprus in 1991.

Thank you all,

Eleni P. Andreou

Christiana M. Philippou

PART I

ABSTRACT

"The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Lifestyle Changes for Adults in Cyprus"

BACKGROUND and AIM: Research showed that behavioural modification techniques were the most effective way to achieve and maintain a healthy weight compared to diet and exercise alone. If behavioural modification was the most effective technique, then at least the two thirds of the candidates (Weight Loss Candidate with Behaviour Modification-WLCB) who used the specific behavioural modification techniques regarding eating and physical activity would achieve a weight loss of average ½ -1kg per week for the 18 weeks of the treatment and then maintain it or continue to lose after treatment termination with a total treatment period of 36 weeks. The treatment was efficient and long-lasting compared to the control candidates who followed a diet plan only. Furthermore, if the use of behavioural modification was the most effective way for diet and exercise, then the weight loss and maintenance would be more efficient and long-lasting. The principal aim of this project was to develop behaviour modification techniques (protocol and guidelines) in order to promote effective weight management for sedentary and active Cypriot adults, concentrating on nutrition and exercise.

STUDY DESIGN: The study was quantitative and qualitative in nature using an action research approach. Furthermore, it was observational and longitudinal using structured methods and a representative sample of adults 19-50 years of age is investigated for 36 weeks.

METHODS: Anthropometric data and health and diet history were taken using standard methods from 315 (the control and intervention group (1:1) Cypriot adults from rural and urban areas.

Individualised diet plans, personalised physical activities as well as behavioural modification parameters were assessed with the aid of a questionnaire, interview, food and exercise diary and behavioural checklist. Obesity and overweight were defined using the current International Obesity Task Force definition. The validated questionnaires for Physical Activity (IPAQ) and the nutritional assessment (National Integrated Health Associates) were used for initial assessment and the behavioural checklists were used for the follow up. Behavioural checklists were completed by the candidates on a bi-weekly basis along with the food and exercise diary. The questionnaire reliability (test-retest),

internal consistency and ability to differentiate obese vs. normal-weight adult behaviours were tested using a pilot population of 50 adults not enrolled in a formal weight loss programme. Its reliability (checklists, food and exercise diary) and predictive validity were tested using a selective population: 265 adults of the observational group enrolled in behavioural modification treatment vs. diet.

OBJECTIVES OF THE STUDY: The objectives of the research were

a) The study of every aspect of weight management and thus be capable of making suggestions for the development of guidelines and protocols for behavioural modification to health professionals working with the public.
b) The identification and adjustment of eating and exercise behaviour related to body weight in order to achieve an efficient weight management in Cypriot overweight/obese adults.
c) The evaluation of the effectiveness of the modest lifestyle changes in weight management induced by short-term energy/calorie restriction and behaviour modification in overweight and obese Greek Cypriots with Body Mass Index (BMI) above 25 or 30 respectively, or body weight 20% or above of Ideal Body weight (IBW), or body fat above normal levels.
d) The development of education and counselling protocols and guidelines for professionals for weight management protocols based on the Mediterranean Diet and the eating and exercise habits of Cypriot Adults.
e) The implementation of the protocols to intervention groups in order to identify the efficiency.

OUTCOMES: The outcomes of the project was the development of an education and counselling protocol/manual which included teaching tools and guidelines for professionals for weight management with the title "Protocol and Guidelines for professional users for weight management for Adults: assessment, categorization, therapy/ follow up of overweight and obesity". The development of an eating behaviour and physical activity protocol/manual based on the Mediterranean Diet and the

demonstrated eating and exercise habits of Cypriot Adults can be used by the stakeholders and the public for efficient and effective weight management.

RESULTS: The average length of weight loss treatment was 18 weeks for the intervention and the control groups, and the average weight loss for the intervention group was 11.96kg (t-test, p-value ≤ 0.001) and for the control group was 5.56kg (t-test, p-value≤ 0.002). During the 18 weeks of the maintenance period the 50% of the intervention group continued to lose while, an additional 48% of them maintained the weight and only 2% of them gained weight.

CONCLUSIONS: To conclude, the prevalence of obesity worldwide has reached epidemic proportions. Physical inactivity and poor diet have been identified as primary contributors to the leading causes of death in developed countries including Cyprus. It is unfortunate that more emphasis is given to calorie restriction dieting rather than behavioural modification for diet and physical activity in achieving and maintaining weight loss. The fact is that incorporating appropriate behavioural modification techniques for diet and sufficient physical activity into one's life is an essential component of achieving a healthy body weight.

The research project aimed at developing a behavioural approach and behavioural modification techniques for the treatment of obesity and weight management adjusted to the needs of the Cypriot adult population. The difference of this approach underlines the emphasis that has to be given to the follow-up programme for the maintenance of the weight loss through behavioural modification. This approach evolved from the environmental control of eating behaviour to a broader approach characterized by systematic manipulation of all factors associated with eating and exercise patterns. The need for the project derives from the fact that obesity is a chronic condition with a substantial potential for relapse; therefore long–term treatments are needed. The expected outcomes of this project are the development of guidelines and protocols to be used by health professionals. The ultimate goal is the reduction of the obesity epidemic in Cyprus.

CHAPTER 1
INTRODUCTION

INTRODUCTION

The title of this research project (DProf) is **The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Lifestyle Changes for Adults in Cyprus**. This is a joint project for a Professional Doctorate with two equally contributing researchers and candidates. The research is made up of two distinct parts:

(1) the part of Behaviour Modification regarding eating habits and behaviour (by Eleni Andreou) and
(2) the part of Behaviour Modification regarding physical activity habits and behaviour (by Christiana Philippou).

The need for the research was derived from the contemporary status of obesity in the world. Obesity is a growing international health problem that has already reached epidemic proportions. Effective methods of treatment are needed, and should be taught by efficient means to dietitians and other health professionals dealing with weight management. There is an obvious gap (Anderson 2008) between the rising obesity prevalence with its high toll on medical and nutritional resources, and the lack of obesity education provided to practitioners in the course of their training. One particular shortfall is the lack of representation of obesity on standardized medical examinations. Physicians' attitudes toward obesity are influenced by their lack of familiarity with the management of the disease (Treyzon 2005).

Management of obesity may include dietary restriction, increasing physical activity, behaviour modification, pharmacotherapy, and surgical interventions. On the other hand the dietitians' input in the health care team for obesity needs to become more aggressive and give emphasis to behavioural modification for the effective treatment of obesity. Thus, curriculum changes in the medical and nutrition education of obesity could help reduce morbidity and mortality associated with this disease.

Obesity is a complex and increasingly prevalent disorder that can present a number of medical, social, and psychological problems (Myles 2000).

As a result, a variety of treatment strategies falling under the generic umbrella of "behaviour therapy" has been developed (Gaudiano 2008) and continues to be refined and expanded. In this project report, different behavioural approaches to the problems of obesity are outlined and reviewed, and specifically those that target (a) body weight or composition, (b) lifestyle factors and other health-related variables, and (c) related psychological variables such as self-esteem and assertiveness, as well as negative attitudes toward obese persons held by non-obese individuals. For each of these targets of change, approaches to both individual- and group-level interventions are considered. Suggestions for future research and clinical work are offered. Throughout, the importance of conceptualizing obesity as a multifaceted problem is emphasized. The necessity for explicit target goals when attempting to modify behaviour is also highlighted (Myles et al 2000). Behaviour modification is a treatment approach, based on the principles of operant conditioning that replaces undesirable behaviours with more desirable ones through positive or negative reinforcement. Behaviour modification targets observable and measurable behaviours for change. It is based upon the principle that all behaviour follows a set of consistent rules, and that methods can be developed for defining, observing, and measuring behaviours, and for designing effective interventions. Behaviour is shaped by its consequences, and under the right set of consequences, all people involved can function effectively. Behaviour modification involves the use of Reinforcement to strengthen positive behaviour and Punishment to weaken regative behaviour (Mather et al 2001).

Moreover, obesity significantly increases a person's risk of cardiovascular diseases and morbidity (Berke et al 2000). Modification of lifestyle behaviours that contribute to obesity (e.g. inappropriate diet and inactivity) is the cornerstone of treatment. Behaviour modification involves using such techniques as self-monitoring, stimulus control, cognitive restructuring, stress management and social support to systematically alter obesity-inducing behaviours. In addition, adjunctive pharmacotherapy can play an important role in the routine medical management of obesity (Lyznicki 2001).

Behaviour therapy techniques are receiving increasing attention in the treatment of childhood and adulthood obesity (Barlow 1998). Lifestyle changes are modifying or

eliminating long-held habits of eating or physical activity and maintaining the new habits over months and years (Kumar 2002).

This research project will provide a review of the experimental and longitudinal study with a panel format as the sample was randomly chosen from the clientele of the dietitians/researchers from all over Cyprus and it was surveyed at regular intervals. This study has utilized behaviour therapy techniques with the adult population. It further defines and describes specific behaviour therapy techniques utilized in the modification of eating, exercise, and diet patterns in adulthood obesity, including stimulus control, stimulus and response generalization, prompting, positive reinforcement, shaping, contingency contracting, and generalization and maintenance strategies.

Currently, obesity is defined as a body mass index (BMI = weight in kilograms divided by height in meters squared) of 30 kg per m^2 or more. There are three classes of severity: Class I (BMI of 30.0 to 34.9 kg per m^2), Class II (BMI of 35.0 to 39.9 kg per m^2) and Class III (BMI of equal to or greater than 40.0 kg per m^2) (National Heart, Lung, and Blood Institute, National Institute of Diabetes and Digestive and Kidney Diseases 1998).

Successful management of the obese patient involves multiple treatment strategies, most focusing on modification of the patient's lifestyle (e.g., diet and physical activity habits). Behaviour modification, although not an intervention itself, is a systematic method for modifying eating, exercise or other behaviours that may contribute to or maintain obesity. Behaviour modification techniques include self-monitoring, stimulus control, cognitive restructuring, stress management and social support. (Berke 2000). For the purposes of the behaviour strategies plan to be presented in this project report, the behaviour modification intervention lasted 36 weeks and included multiple treatment strategies and it was concentrate only on the modification of eating habits and exercising.

According to the epidemiological study of obesity performed by the Cyprus Dietetic and Nutrition Association (2005-2009) the nutritional habits of the Cypriot adult population were investigated. As far as concern the breakfast habits of the Cypriot

adults, breakfast and/or a midmorning snack was consumed. Actually, 24,2% of the subjects reported that they consumed breakfast only, 11,1% mid-morning snack only, 61% had both, and 3,7% had neither breakfast nor a mid-morning snack. The main meals eaten per day were 2.7 ± 0.9 and the number of snacks per day were 1.9 ± 1.12, where the numbers after the ± sign indicate one standard deviation. According to the study 76,8% of the participants eat breakfast regularly, 76,9% eat lunch, 60,8% eat dinner and 39,9% eat intermediate meals (Andreou et al 2009).

Furthermore, the study showed that 98.3% of adults in Cyprus used olive oil in salads or with pulses/beans, and 0.5% of them vegetable seed oil. The majority of Cypriot adults drink either 1-4 glasses (35.2%) of water, or 5-8 glasses of water (37.3%). In addition, 25.3% drunk >8 glasses of water and only 2.2% drunk 0 glasses per day. The 57.2% of the subjects consumed only the salt used in cooking, 33.9% added salt after cooking, 2.9% used low-salt, 4% did not use any salt and 1.7%, and didn't use salt but use flavouring cubes instead. Also, 8% were drinking whole fat milk, 55.5% semi skimmed milk and 18.6% skimmed milk (ibid).

The study also investigated the level of physical activity in the population. On an average day, the subjects spent 9.8 ± 5.0 hours sitting down. On the question of how physically demanding their job was, 54.1% reported very little, 31.6% a little bit, 7.7% fairly demanding, and 6.6% heavily demanding. During a typical week, the subjects spent 0.43 ± 1.21 days engaged in intense physical activity, 1.1 ± 2.08 days engaged in medium intensity physical activity, and 1.6 ± 2.28 days engaged in low-level intensity physical activity (ibid).

PURPOSE OF THE PROJECT

The project has two main goals and is subsequently divided into two main subject areas, one for each partner. The goals and the subject areas are as followed:

a. Identifying Behaviour Modification Techniques to Promote Effective Weight Management for Sedentary and Active Adults Concentrating on Nutrition and Exercise (by Eleni Andreou) and,

b. Measuring Physical Activity to Promote an Active Lifestyle to Sedentary and Active Adults (by Christiana Philippou).

Upon the completion of the project the following will be presented:

a. the benefits of behaviour modification techniques to promote effective weight management and
b. the delivery of protocols and educational tools

The purpose of the study is identified as followed:

- Collect information on the nutritional habits of Cypriots
- Collect information on the level and frequency of physical activity of Cypriots
- Investigate correlations between nutritional habits, and level of physical activity.
- Develop and implement behaviour modification techniques for the achievement and maintenance of healthy weight and fitness to be used by dietitians and other health professionals dealing with weight management.
- Prepare a Set of Nutritional Guidelines for Weight Management for the Cypriot Population
- Provide recommendations for future practice and research

There is an imperative need for further study into behavioural modification in nutrition and physical activity habits and the development of guidelines and protocols currently available for the Cypriot population. Cyprus is in need of a specific policy to fight obesity among adults and children, which has taken on serious dimensions according to a European programme aimed at setting a pan-European precautionary policy.

The European PorGrow programme's measures include an improvement of information and education regarding food, nutrition, health and exercise, better control over advertising, a regulation of food sales and supply, and an increase in exercise.

Also worrying was the fact that Cypriot men ranked second in an international survey on obesity and Cypriot women ranked fifth, while Cypriot children were among the five leading countries (Savva et al 2005).

The overall aim of the present study is to show that behaviour modification strategies, extended treatment and physical activity are excellent predictors of weight loss during treatment. That is why it aims to develop a behavioural approach for the treatment of obesity adjusted to the needs of the Cypriot adult population. The difference of this approach underlines the emphasis to be given to the follow up programme for the maintenance of the weight loss. This approach will be evolved from the environmental control of eating behaviour to a broader approach characterized by systematic manipulation of all factors associated with eating and exercise patterns. The need for the project derives from the fact that obesity is a chronic condition with a substantial potential of relapse; therefore longer–term treatments are needed. The outcome of this project is the development of guidelines and protocols to be used by health professionals. The ultimate goal is the reduction of the obesity epidemic in Cyprus and in conjunction with the goals set by the European Health Congress to decrease the incidence of obesity by 2010 by 20 % (IOTF 2000).

Main research questions, hypothesis, objective, outcomes
For the purposes of the proposed study significant questions were raised.

RESEARCH QUESTIONS:

1. How can we measure specific Eating Habits and Physical Activity through the use of Behaviour Modification techniques to promote an Active Lifestyle and sound Nutritional Habits for overweight/obese adults?

2. Is behavioural modification for eating habits and exercise an effective way to treat obesity/overweight in terms of weight loss and maintenance?

3. Does the weight loss that results from a behaviour modification in combination with exercising and dieting outweigh or not outweigh the weight loss from dieting?

4. Is there a link between behaviour modification along with nutrition and exercise intervention and maintenance of the weight lost?

HYPOTHESIS

The whole project was based on the following hypothesis:

Research shows that the behavioural modification techniques were the most effective way to achieve and maintain weight loss comparing to diet alone. If the candidates (Weight Loss Candidate with Behaviour Modification-WLCB) used the specific behavioural modification techniques regarding eating and physical activity, then at least two thirds of them would achieve a weight loss of average ½ -1kg per week for the 18 weeks of the treatment and then maintain it or continue to lose after treatment termination with a total treatment period of 36 weeks efficiently and long-lasting compared to the control candidates who followed a diet plan only.

Analysis of the hypothesis can be found in the Appendix 1

Most objectives have been prepared in common although there were objectives that have been dealt individually by either of the candidates. Eleni Andreou was responsible for investigating the eating behaviour of Cypriot adults while Christiana Philippou was responsible for investigating the physical activity behaviour of Cypriot adults. Both of the researchers were aiming to develop and implement behavioural modification techniques for the efficient and effective management of weight loss.

Individual Objectives of Eleni Andreou's proposal

- The description of the defining characteristics of eating habits of overweight/obese subjects.
- The application of the behavioural modification techniques for nutrition to overweight/obese subjects.
- The identification of the results of the treatment with the use of behavioural modification techniques for nutrition and their application at various settings for effective weight loss.
- The development of protocols and guidelines for behavioural modification techniques for eating habits aiming weight management to be used by health professionals.
- The identification of the benefits of good eating habits to the management of weight and fitness level of the subjects following the behavioural modification techniques regarding nutrition.

Outcomes of Eleni Andreou's proposal:

- The development of a manual (including protocol and guidelines) and teaching tools for behavioural modification techniques for eating habits aiming weight management to be used by health professionals.
- The development of practical guidelines for behavioural modification techniques for eating habits aiming weight management to be used by the consumers and the Cyprus Ministry of Education and Culture.

The Cyprus Dietetic Association and the Cyprus Board of Registration of Food Scientists/Technologists and Dietitians have expressed their commitment to publish these outcomes.

Individual Objectives of Christiana Philippou's proposal

- The description of the basic characteristics of a systematic exercise programme for overweight/obese subjects.
- The application of the behavioural modification techniques for exercise to overweight/obese subjects
- The identification of the results of the treatment with the use of behavioural modification techniques for exercise and their application at various settings for effective weight loss.
- The development of protocols and guidelines for behavioural modification techniques as regards Physical Activity and weight management to be used by health professionals.
- The identification of the benefits of physical activity to the weight management and fitness level of the subjects following the behavioural modification techniques regarding exercise.

Outcomes of Christiana Philippou's proposal:

- The development of manual/protocol, teaching tools and guidelines for behavioural modification techniques for Physical Activity for weight management to be used by health professionals.
- The development of practical guidelines for behavioural modification techniques for Physical Activity for weight management to be used by the consumers and the Cyprus Ministry of Education and Culture
- The Cyprus Dietetic Association and the Cyprus Board of Registration of the Food Scientists/Technologists and Dietitians have expressed their commitment to publish them.

Common objectives for both candidates

a) The identification and adjustment of eating and exercise behaviour related to body weight in order to achieve weight management in Cypriot overweight/obese adults.
b) The evaluation of the effectiveness of the modest lifestyle changes in weight management induced by short-term energy/calorie restriction and behaviour modification in overweight and obese Greek Cypriots with Body Mass Index (BMI) above 25 or 30 respectively, or body weight 20% or above of Ideal Body weight (IBW), or body fat above normal levels.
c) The development of education and counselling protocols and guidelines for professionals for weight management protocols based on the Mediterranean Diet and the eating and exercise habits of Cypriot Adults.
d) The implementation of the protocols to intervention groups in order to identify the efficiency.

Outcomes (common):

- Development of an education and counselling protocol/manual, teaching tools and guidelines for professionals for weight management
- Development of an eating behaviour and physical activity protocol/manual based on the Mediterranean Diet and the eating and exercise habits of Cypriot Adults to be used by the stakeholders and the public for efficient weight management.

Overweight and obesity are well-known risk factors for increased morbidity and mortality as well as for impaired quality of life (Nilsson 2002). Personal eating behaviours, physical activity and other lifestyle habits are in much individuals interplay with the environment. The purpose of the treatment is to help persons become conscious of their own behaviour and to give them the support that is needed to take long-term control over their own lives and change their lifestyle. Behavioural change is obtained through practicing new positive behaviours to increase the likelihood of treatment success. Emphasis is on the change of daily behaviour which is a significant intervention in both human and family life (Myles 2000). A programme to assist persons to become conscious of their behaviour and start a process of behaviour change includes education, motivation, activating of the person and presence in situations where extra support is needed. Awareness and identification are the starting points and first steps in promoting the habits that are easiest to change.

CHAPTER 2
LITERATURE REVIEW

The worldwide incidence of obesity is increasing. In fact a new word - "globesity" has now been coined to reflect the escalation of global obesity and overweight. In 1998, the World Health Organization (WHO) published a report entitled "Obesity: Preventing and Managing the Global Epidemic", which classified obesity as a growing epidemic. According to WHO, if immediate action is not taken, millions will suffer from an array of serious weight-related disorders. Obesity is so pervasive in modern society that health professionals address this issue on a daily basis (Fontaine 2003; Calle 2003). Obesity is epidemic worldwide (Caballero 2007). Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. A crude population measure of obesity is the body mass index (BMI), a person's weight (in kilograms) divided by the square of his or her height (in metres). A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight. Currently, obesity is defined as a body mass index (BMI = weight in kilograms divided by height in meters squared) of 30 kg per m^2 or more. There are three classes of severity: Class I (BMI of 30.0 to 34.9 kg per m^2), Class II (BMI of 35.0 to 39.9 kg per m^2) and Class III (BMI of equal to or greater than 40.0 kg per m^2) (Heart, Lung, and Blood Institute, National Institute of Diabetes and Digestive and Kidney Diseases 1998). Moreover, in 1997, the International Obesity Task Force (WHO 1998), convened by the World Health Organization (WHO), recommended a standard classification of adult overweight and obesity based on the following BMI calculations: a BMI of 25.0 to 29.9 kg per m^2 is defined as overweight; a BMI of 30.0 kg per m^2 or more is defined as obesity. In 1998, the Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults, convened by the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health, adopted the WHO classification system. In adults, overweight and obesity are defined as BMI levels at which adverse health risks increase.

Overweight and obesity are major risk factors for a number of chronic diseases, including diabetes, cardiovascular diseases and cancer. Once considered a problem only in high income countries, overweight and obesity are now dramatically on the rise in low- and middle-income countries, particularly in urban settings (WHO 2000; IOTF 2000).

For the first time, the number of overweight individuals around the world rivals the number who are underweight. Developing nations have also joined the ranks of countries troubled by obesity. A 1999 United Nations (UN) survey found obesity growing in all developing regions, even in countries beset by hunger. In China, the number of overweight people rose from less than 10 percent to 15 percent in just three years. In Brazil and Colombia, the figure of overweight is about 40 percent - comparable with a number of European countries. Even sub-Saharan Africa, where most of the world's hungry live, is witnessing an increase in obesity, especially among urban women. In all regions, obesity appears to escalate as income increases.

In the United States, obesity is the most common chronic disease, affecting more than 1 in 4 of all Americans, including children, and its incidence has been steadily increasing for the past 20 years. In Europe, Australia/New Zealand, the Middle East, and the remaining portions of the Americas, the occurrence of obesity appears to be increasing and is now between 10 and 20 percent. The prevalence of obesity is still fairly low in China, Japan, and many countries in Africa. Table 1 shows the prevalence of obesity worldwide (IOTF 2009).

Table 1. Percentage of Obese Adults in Europe, Australia and USA

Country	Percentage of Obese Men	Percentage of Obese Women
Finland (2005)	14.4	19.3
Russia	10.8	27.9
England	17	20
Germany	17.2	19.3
Czech	16.3	20.2
Scotland	15.9	17.3
Belgium	12.1	18.4
Spain	11.5	15.2
Sweden	10	11.9
France	9.6	10.5
Denmark	10	9
Holland	8.4	8.3
Italy	6.5	6.3
Cyprus(1999-2000)	26.6	23.7
Greece(2003)	26	18.2
Australia	18	18
USA (2003-2004)	31.1	33.2

Source: International Obesity Task Force 2009

According to the National Health and Nutrition Examination Survey (NHANES III 1988 to 1994), between one third and one half of U.S. men and women 20 years and older are overweight; nearly one fourth are clinically obese (i.e., BMI >= 30.0 kg per m^2). The joint prevalence of overweight and obesity (defined as a BMI >= 25.0 kg per m^2) in persons 20 years or older is about 60 percent in men and 51 percent in women. This is on the contrary with the results of NHANES II (1976 to 1980), which showed the joint prevalence of overweight and obesity to be 51 percent in men and 41 percent in women. It should be noted that essentially all of the increased prevalence from NHANES II to NHANES III is due to an increase in the prevalence of obesity rather than overweight. Results of NHANES III indicate that overweight and obesity are common in both sexes and all age groups but particularly high in Mexican-American men, black and Mexican-American women, and women of low socioeconomic status.

Results of NHANES III also show an increasing prevalence of overweight in children six years and older, in both sexes and all subpopulations surveyed. (National Institutes of Health, National Heart, Lung, and Blood Institute 1998; WHO 1998). In the past 30 years, the prevalence of overweight among children and adolescents has doubled. National data indicate that approximately 14 percent of children (6 to 11 years of age) and 12 percent of adolescents (12 to 17 years of age) are overweight at the 95th percentile of BMI.14 (Note: In NHANES III, overweight in children and adolescents is defined as a BMI level at or above sex- and age-specific 95th percentile values derived from the second and third National Health Examination Surveys (NHES II and NHES III) (Troiano 1995).

The health benefits of the Mediterranean Diet have been examined (Kafatos et al 2003). Convincingly, Kafatos proposed that hasty changes in lifestyles have gone simultaneously with changes in eating habits. People do not exercise enough and characteristically over-eat, predominantly fatty foods. This has led to an increase in overweight and obesity worldwide, so that epidemiologists speak of an epidemic upsetting more than 250 million people. Overweight and obesity are major risk factors for cardiovascular diseases (ibid). Health professionals advise their patients to lose weight and make healthier food choices guided by the traditional Mediterranean diet. However,

the type of traditional Mediterranean diet that is linked to several health benefits is vividly different from the contemporary diet of those living in the Mediterranean regions. In Crete, the biggest island of Greece with more than 500 000 population, one third of the children and more than half of the adults are overweight or obese. In the 1960s middle aged farmers in Crete had a mean body weight of 63 kilograms; today it is 80 kilograms. These same authors indicate that as a result of overweight and obesity, almost five percent of the children in Crete and 18 to 44 percent of middle aged adults have the group of symptoms which together with insulin resistance are known as the Metabolic Syndrome (ibid). The reason for this development is the remarkable change in the Cretan diet, predominantly the increase in meats and animal products consumed. This has expected an increase in saturated fatty acid intake from eight percent of total energy intake in the sixties to 15 - 16 percent in adolescents today, at the same time, the intake of monounsaturated fat intake, chiefly obtained from olive oil, has been decreasing. The health benefits of the traditional Mediterranean diet are genuine, provable and well-known if applied to the current dietary patterns in the Mediterranean region.

According to the epidemiological study by the Cyprus Dietetic Association (Andreou et al 2005-2009) to determine the percentage of obesity and overweight in Cyprus and the dietary/nutritional habits of the Cypriot population, it was concluded that obesity and overweight rates are highly prevalent. High-calorie meals and snacks combined with a sedentary lifestyle are among the main reasons for adult obesity in Cyprus. On the whole Cypriots are generally overweight, with Cypriot men being in worse shape than Cypriot women who care more asession their weight than men. Cypriots generally avoid physical exercise and undervalue the importance of regular exercise, however they are well-informed asession nutritional issues. Obesity and overweight contribute to health problems such as dyslipidemia, lower back pain and joint pain, high blood sugar (Andreou et al 2009). The results presented are final and are derived from the representative sample of 1000 subjects for which a full statistical analysis was carried out. The sample was in compliance with Cyprus demographics and had the following representative proportion: 48.5% men and 51.5% women, from all over Cyprus. The sample was selected randomly through the use of the 2005 telephone directory.

Partisipation was on a purely voluntary basis. According to the research, the Cypriot adult population has an accurate perception of their weight situation as 63% of them consider themselves to be above the normal weight and 30.5% consider themselves at the normal weight. The percentage of Obese/Overweight people in the Cypriot population is 75.7% for men and 52.9% for women. The percentage of overweight people in Cyprus is 36% and obesity stands at 27.8% (ibid).

The prevalence of childhood and adolescent obesity was estimated for the first time in a representative sample from Cyprus (Savva et al 2005), and this rate is analogous to that observed in North America. These results indicate the need for individual and population measures for the treatment and prevention of paediatric obesity (IOTF 2002). According to Obesity IOTF (2005) Cyprus ranked in the 3rd position for obesity/overweight among European countries. Furthermore, in the study on the Metabolic Syndrome in Cyprus (Loizou et al 2006), obesity was determined to be 20.3% and overweight 35.2% of the adult population However, even a small weight loss (5–10%) is associated with significant improvement in health issues such as glycemic control, dyslipidemia, and hypertension (National Heart, Lung, and Blood Institute, National Institutes of Health 2000) (see also Table 2). These improvements along with concomitant reductions in the waist circumference, as a direct effect of the weight loss, have positive effects on the set of conditions that define metabolic syndrome and other risk factors and conditions such as mortality, diabetes, obesity, cancer, and hypertension.

Table 2 – Health Benefits from a 10 kg Weight Loss

Mortality:
• Decrease > 20% of total mortality • Decrease > 30% of diabetes incidences • Decrease > 40% of obesity and cancer
Blood Pressure:
• Decrease 10 mm Hg systolic • Decrease 20 mm Hg diastolic
Diabetes:
• Decrease 50% of fasting blood glucose
Blood lipids:
• Decrease 10% in total cholesterol • Decrease 15% in LDL • Decrease 30% in triglycerides • Increase 8% in HDL

Source: National Heart, Lung, and Blood Institute, National Institutes of Health 2000

National Heart, Lung, and Blood Institute (2002) proposed that obese people should endeavour to lose and maintain their weight through a combination of a low-calorie diet (or caloric controlled diet adjusted to the principles of the Mediterranean diet for this proposed research), regular physical activity, and behaviour therapy. Behaviour therapy included the Total Lifestyle Changes (ibid) and it demoted to a set of principles and techniques for accepted new eating, activity, and thinking habits (Calle et al 2003). The Total Lifestyle Changes principles which were based on ATP III (Adults Treatment Panel

III) (NHLBI 2002) are presented in Table 3 and they were used for the purposes of this research.

Table 3 – Therapeutic Lifestyle Changes: Nutrient Composition of TLC Diet

Nutrient	**Recommended Intake**
Saturated fat*	Less than 7% of total calories
Polyunsaturated fat	Up to 10% of total calories
Monounsaturated fat	Up to 20% of total calories
Total fat	25-35% of total calories
Carbohydrate**	50-60% of total calories
Fibre	20-30 grams per day
Protein	Approximately 15% of total calories
Cholesterol	Less than 200 mg/day
Total calories (energy)	Balance energy intake and output to maintain expenditure healthy body weight/ prevent weight gain
* Lower trans fatty acids **Emphasize complex source	

Source: NHLBI 2002

BEHAVIOUR MODIFICATION

According to Mather et al (2001),

> "Behaviour modification is a treatment approach, based on the principles of operant conditioning that replaces undesirable behaviours with more desirable ones through positive or negative reinforcement."

Behaviour modification aims apparent and quantifiable behaviours for change. It is based upon the principle that all behaviour follows a set of consistent rules, and that methods can be developed for defining, observing, and measuring behaviours, and for designing effective interventions (ibid). Behaviour is formed by its consequences, and under the correct set of consequences, all people involved can perform effectively. Behaviour modification involves the utilization of Reinforcement to fortify behaviour and Punishment to deteriorate behaviour.

Behaviour modification is derived from the principles of operant conditioning, which were developed by American behaviourist B. F. Skinner (1904-1990). Skinner formulated the concept of operant conditioning, through which behaviour could be shaped by reinforcement or lack of it. He considered his concept applicable to a wide range of both human and animal behaviours and introduced operant conditioning to the general public, The Behaviour of Organisms.

One behaviour modification technique that is widely used is positive reinforcement, which encourages certain behaviours through a system of rewards. In behaviour therapy, it is common for the therapist to draw up a contract with the client establishing the terms of the reward system (Martin 2007).

Another behaviour modification technique is negative reinforcement. Negative reinforcement is a method of training that uses a negative reinforcement. A negative reinforcement is an event or behaviour whose reinforcing properties are associated with its removal. For example, terminating an existing electric shock after a rat presses a bar is a negative reinforcement (ibid).

In addition to rewarding desirable behaviour, behaviour modification can also discourage unwanted behaviour, through punishment. Punishment is the application of an aversive or unpleasant stimulus in reaction to a particular behaviour. For children, this could be the removal of television privileges when they disobey their parents or teacher. The removal of reinforcement altogether is called extinction. Extinction eliminates the incentive for unwanted behaviour by withholding the expected response. A widespread parenting technique based on extinction is the time-out, in which a child is separated from the group when he or she misbehaves. This technique removes the expected reward of parental attention (ibid).

Based on Mather et al (2001), the following actions can be utilized to handle behaviour through consequences:

1. Identify the problem.
2. Propose a way to change the behaviour.
3. Name an effective reinforce.
4. Apply the reinforce constantly to change or outline the behaviour.

Behaviour modification is also used to enhance behaviour controls of individuals with special needs. For individuals who have difficulty in controlling their behaviours, it is critical to find antecedent events that trigger inappropriate behaviours and look for effective consequences to modify the behaviours. The ABC model provides a framework to identify Antecedent, Behaviour, and Consequence (Martin 2007). One of the most simple yet effective methods of functional behavioural assessment is the"ABC" approach, where observations are made on **A**ntecedents, **B**ehaviours, and **C**onsequences (Maag 1995). In other words, "What comes directly before the behaviour?", "What does the behaviour look like?", and "What comes directly after the behaviour?" Once enough observations are made, the data are analyzed and patterns are identified. If there are consistent antecedents and/or consequences, then an intervention should target them in order to increase or decrease the target behaviour. This method has formed the core of positive behaviour support for children in school from both regular education and special education. It pursues a summary of the ABC's of weight control.

The ABC's of Weight Control

At some point in their lives, people who are overweight learned some eating behaviours that caused weight gain. For some, it was in childhood, when they were told to finish their plate (regardless of how full they were), or were punished or rewarded by food. For others, food became a way of dealing with stress, of avoiding or putting off difficult tasks or dealing with difficult people, or a way of comforting themselves in good and bad times.

If one accepts that habits or behaviours have contributed to weight gain, then it makes sense to use an approach that goes beyond just reducing calories to lose weight. To make permanent changes in the body weight, one must change the behaviours that caused the problem in the first place. Behaviour modification is an approach that has been used very productively to change life habits like smoking, overeating, stress management, and exercise. Over the past three decades, much has been learned asession how to apply behaviour modification more successfully and it is now accepted as a very important part of a good weight control programme.

The ABC's are defined as the Basics of Changing Behaviours. Eating is a behaviour, not a part of the personality. Many have identified themselves as "emotional eaters." As an option, eating should be thought as an action of a person and not to be confused as a trait of the person. Eating is a learned procedure and it can be "unlearned" and modified if the behaviour can be observed and identified.

The ABC's

When behaviour like overeating is analyzed, behaviour modification distinguishes three parts: **A = antecedent or the action**, **B = behaviour of eating and exercise**, and **C = consequences**. For instance, the action of being in a certain place (the kitchen), or having certain feelings (boredom, anger, stress) cause B (eating). The C or consequence of A and B can be weight gain.

Learning new ABC's

Determining the A's (what causes overeating for a person?) is a matter of observing the behaviour and writing it down. For example, as opposed to just writing down what was eaten, a record of events - time, place, people, and feelings in a journal or the day timer is kept. Look at the patterns - are there people, places, or feelings that really lead you to overeat? Overeating is not a character flaw or simply the lack of will power - it is the result of circumstances and the individual's reaction to them. If the individual can identify the most critical circumstances by taking the time to make these personal observations, this same person is in the first stages of changing the overeating behaviour.

If the individual says "it's too much trouble" or "I don't have time for that", then that person needs to assess the commitment to the weight goal. This is an important discovery process and cannot be ignored.

There are several types of antecedents or triggers:

Sensory: these are things the person sees, smells, or tastes that promote the desire to want to eat. Situations like having snacks in a bowl in the room, hearing someone talk asession good tasting food, seeing a commercial asession ice cream, or taking the first bite of a food you really like are very strong cues to eat more, regardless of hunger.

Physiologic: these are feelings the body creates when it needs or expects food. Such could be headaches, stomach growling, fatigue, tension, feeling tired, salivating. These feelings of hunger can be triggered when real hunger may not be present.

Social: others eating food, entertaining, and other social events that involve food are situations involving others that can cause some people to overeat.

Emotional: many negative feelings are strong cues to overeat. Depression, frustration, anger, boredom, loneliness, guilt, rebellion, and feelings of deprivation are some common feelings that lead to overeating.

Once some of the "A"s (actions/antecedents to overeating and lack of exercise) have been identified a plan can be made to change the reaction to them. Below is a list of common situations or "triggers" that lead to overeating with some new choices to replace overeating and lack of exercise.

A = Action/Antecedent

Coming home after work, tired, hungry, need to relax!

B = New Behaviour

"Do not let yourself be so hungry at the end of the day which will consequently lead you to bad eating decisions. Instead, pack an extra piece of fruit, some low-fat yogurt or other snack and eat it before you get home. When you walk through the door, you will not be as hungry, and you will be in a better position to find another way to relax before dinner instead of overeating. As far as the exercise involvement in the daily programme is concerned, start the day with a 30 minute walk, park the car away from work in order to give yourself the chance for some activity, use the stairs instead of the elevator".

A = Action/Antecedent

Sitting in front of the computer or t.v., time to grab a snack!

B= New Behaviour

"Separate your eating from any other activities. Eat at your dinner table only. Get some bottled water or other calorie free beverage and have that when you are watching TV, or working at your desk".

A = Action/Antecedent

Mood - something has caused frustration, sadness or loneliness- time to grab some "comfort" food!"

B = New Behaviour

"Talk it out with a trusted friend or relative if that is possible at the time. If not, write it out! Keep a journal handy and take the time to write down your feelings, it will give you time to sort things out instead of eating. Getting a variety of support from others is important - sometimes it is difficult to do things by yourself. That is one reason we have a "diet pals" area in our member's section. Sometimes just having someone to write to, can give you a new perspective and some much needed understanding. Get your frustration out by exercising".

A= Action/Antecedent

Mood – there are the feelings of anger and resentfulness - time to eat something to calm you down!

B = New Behaviour

"Sometimes when you are angry you are not able to express it to others (like when you are angry with your boss). Eating seems like a harmless alternative, but it is destructive when it causes you to feel bad and gain weight. One of the best ways to "burn off steam" is to actually burn off calories by taking a walk, hitting a tennis ball against a wall, swimming, bicycling, going to the gym. By exercising, you are actually changing your body's chemistry and it gives you a chance to get rid of the negative energy created by feelings of anger or resentment".

The focus on changing your reactions to situations, feelings, and people is a very important part of your success in the long term. Identify your triggers and practice these new behaviours - your efforts will be worth it!

Source: Martin 2007

Due to the diversity considerations regarding the behaviour modification, there are several critics. There are certain populations with greater risk factors for problem

behaviours. They include ethnic minority status, academic difficulty (learning disability), broken homes, poverty, inadequate parental supervision, physical abuse, substance abuse (by self or family members), living in a high crime community, and criminal or delinquent relatives or peers (Carr 2004). Behaviour modification programme are more commonly needed in public schools where these diverse populations are more prevalent. The impact of cultural values is significant in giving to individual values, behaviour, and communication. Behaviour interferences must include sensitivity toward cultural differences, and consider the important role that culture plays in the behaviour of the individual and the values of the family and society (ibid).

Behaviour modification is critiqued in person-centred psychotherapeutic approaches such as Rogerian Counselling and Re-evaluation Counselling (McIntosh 2007). The dispute is that these methods involve connecting with the human qualities of the person to promote healing and that behaviourism is denigrating to the human spirit (Olchowski 2007). Skinner argued against this position by disagreeing that unrestricted reinforcement is what led to the "feeling of freedom" and thus removal of aversive events would allow people to "feel freer" (Forgatch 2007). Further criticism extends to the presumption that behaviour increases only when it is reinforced. There is evidence, however, that imitation is a category of behaviour that can be learned just like anything else (ibid).

Theory of Behavioural Modification

Behaviour modification treatment has several unique characteristics (Calle et al 2003). First, it is goal-oriented. Second, treatment is process-oriented. Third, the behavioural approach advocates small rather than large changes. The behavioural treatment of obesity, as applied in academic medical centres, is clearly effective and is associated with marked improvements in potential weight-related problems. However, little is known asession the effectiveness of behaviour modification treatment as it might be implemented in primary care practice or in community settings. A straight loss of weight through short-term dieting, plastic surgery, or other methods, is not adequate to reverse the epidemic of obesity. Weight loss must be accompanied by the

implementation of life-long behaviour modification principles in order to be successful in the long-term.

According to Wadden (2000) diet alone, exercise alone, diet and exercise, or diets with appetite-suppressants usually result in minimal weight loss with rapid weight regain. When a behaviour modification component is combined with any of these weight loss strategies, the results are far better. The term “behaviour modification” might be a paired term, since successful weight loss behaviour modification aims at reducing caloric intake, increasing physical activity and expanding the nutrition knowledge and food choices for an indefinite period. Although some people can accomplish this separately, most cannot. Conformity with behaviour and lifestyle changes needed to lose weight and maintain weight loss can be extremely difficult because of genetic background; environmental pressures; and ingrained life-long behaviours (ibid). Martin’s (2007) research indicated that regarding weight management female predominated research (failure rate: 44% female, 29% male) and also there was a high incidence of eating disorders- disordered eating behaviours (binge eating and/or extreme weight control).

The first law of thermodynamics applied to nutrition states that change in weight is proportional to the difference which equals to caloric intake minus caloric output. Caloric intake is the number of calories eaten and drank each day, and caloric output is the resting metabolic rate plus any physical activity expenditure. If caloric intake exceeds caloric output, then the excess calories are deposited as fat in the body, and body weight increases. If caloric intake is less then caloric output, then body fat stores supply the necessary calories and weight loss ensues. Reducing caloric intake has been shown to be more efficient than just simply increasing exercise to induce weight loss (Mahan 2000).

Every study (National Heart, Lung, and Blood Institute, National Institute of Diabetes and Digestive and Kidney Diseases 1998) discussing "predictors" of successful weight loss shows that exercising for at least thirty minutes per day at a minimum of four days per week is essential. Engaging in regular physical activity is an even stronger predictor of successful long-term weight maintenance and has the additional advantage of

improving cardiovascular fitness (Vogel et al 2009). The benefits of regular physical activity are listed in table 4.

Table 4 – Health Benefits of Regular Physical Activity

Increased physical fitness
Building and maintaining healthy bones and joints
Building endurance and muscular strength
Weight management
Lower risks for cardiovascular disease, colon cancer and type II diabetes
Control of blood pressure
Promotion of psychological well-being and improved self-esteem
Reduced feelings of depression and anxiety

Source: Vogel et al 2009

In sum, behaviour modification is the altering one or more of the behavioural patterns. In terms of nutrition, this may mean choosing an egg white omelette with fresh fruit instead of bacon, eggs and buttered toast for breakfast. Behaviour modification also includes accomplishing environmental control, which may be to completely avoid a "trigger food" which it cannot be stopped eaten, such as potato chips, nuts or ice cream. Learning the caloric value of various foods, planning eating strategies for vacations or during stressful periods in life can add considerably to the weight loss and maintenance. Victorious behaviour modification requires time and patience and is a critical component to long-term success (Metabolic Weight Loss Solutions 2008).

Behaviour Modification Techniques

Behaviour modification techniques include self-monitoring, stimulus control, cognitive restructuring, stress management and social support (NHLBI 2000).

Therapy and consultation cannot be effective unless the behaviours to be changed are understood within a specific context (Martin 2007; McIntosh 2007). The process of understanding behaviour in context is called functional behavioural assessment (Waguespack 2006). Therefore, a functional behavioural assessment is needed before performing behaviour modification. Behaviour modifiers like to employ a variety of evidenced-based techniques. These techniques intervene at all levels of context. For example, given specific setting events for behaviour, a behaviour modifier may develop a neutralizing routine to eliminate that setting. If a behaviour pattern has a specific antecedent of trigger, then an antecedent control strategy can be developed to train new behaviour in the presence of the trigger. If problem behaviour readily occurs because it achieves some function, then an alternative behaviour can be instructed and trained to occur in the context of the trigger (Martin 2007). If a behaviour is particularly complex it may be task-analyzed and broken into its component parts to be taught through chaining. While all these methods are effective, when the behaviour problem gets difficult or when all else fails many turn to contingency management systems (Waguespack 2006). Complex and comprehensive contingency management systems have been developed and represent effective ways to eliminate many problem behaviours. Collaborative goal setting with the client enhances treatment effects (Martin 2007).

Behavioural Modification and Obesity

Obesity is a chronic disease that affects a substantial number of people living in developed countries. Obesity significantly increases a person's risk of cardiovascular diseases and morbidity. Modification of lifestyle behaviours that contribute to obesity (e.g., inappropriate diet and inactivity) is the cornerstone of treatment. Behaviour modification involves using such techniques as self-monitoring, stimulus control, cognitive restructuring, stress management and social support to systematically alter obesity-related behaviours. In addition, adjunctive pharmacotherapy can play an important role in the routine medical management of obesity (Dickerson et al 2000).

Presently, there is no precise clinical definition of obesity based on the degree of excess body fat that places an individual at increased health risk. General consensus exists for an

indirect measure of body fatness, called the weight-for-height index or body mass index (BMI). The BMI is an easily obtained and reliable measurement for overweight and obesity and is defined as a person's weight (in kilograms- kg) divided by the square of the person's height (in meters-m). If weight is measured in pounds and inches, the BMI is calculated by the following formula: [weight (in pounds)/height (in inches)^2**]** [weight (in pounds-lbs) divided by the square of the person's height (in inches-in)] (Lyznicki 2001).

Rapid changes in body size and composition during growth make assessment of overweight and obesity more complicated in children and adolescents than in adults. Assessment generally includes comparing a child's BMI level to age- and sex-specific target values (ibid).

The necessity for an enhanced comprehension and treatment of obesity is essential in effectual clinical practice. The underlying motivation for treating obesity lies in its adverse medical consequences. Overweight adults (BMI $\geq$ 25, e.g. 165 cm, 68 kg) or obese (BMI $\geq$ 30, e.g. 165 cm, 82 kg) are at increased risk for early mortality (Fontaine et al 2003; Calle et al 2003), as well as for a variety of medical conditions that include type 2 diabetes, hypertension, dyslipidemia, cardiovascular disease, sleep apnea (NHLBI 2000), and cancer (Calle et al 2003). Additionally, obesity is accountable for a high economic load on a nation and has psychosocial costs including poor body image, impaired quality of life, and depression (among the severely obese) (Wadden et al 2000; Kushner et al 1993).

The costs (Wyatt 2006) associated with treating these conditions are becoming increasingly problematic. The cost of obesity-related medical care has increased tremendously since 1987, in addition to lost productivity and income. Treatment cost for obesity is not the only issue of concern. With so many life-threatening illnesses associated with it, there also is an increased mortality for people with obesity. In recent years, it signifies one of the most common causes of preventable deaths. In addition, the widespread emotional and health problems that often result from obesity significantly affect the overall quality of life. Weight loss represents a significant goal for improving physical and psychosocial health. The general anticipation for weight loss, regrettably,

exceeds what is typically seen in clinical or research settings. Another issue that complicates weight management is that many people prefer a fast solution. Most effective treatments require a gradual, long-term approach. These methods typically focus on promoting a sensible diet, moderate physical activity, and behavioural counselling. In isolation, these modalities typically do not lead to significant weight loss. Contemporary multidisciplinary, preventive, and therapeutic approaches, and social changes are needed that address the complex interplay of biologic, genetic, and social factors that have created the current obesity epidemic (ibid).

The treatment of choice for overweight and obese patients is the combination of diet, exercise, and behaviour modification (NHLBI 2000). The first guidelines for obesity were initiated by the Federal Government in USA to address overweight and obesity-conditions that affect an estimated 97 million Americans and are the second leading cause of preventable death in the United States. These evidence-based guidelines, developed by the National Heart, Lung, and Blood Institute in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases, present an approach for the assessment of overweight and obesity and establish principles of safe and effective weight loss (ibid). The updated Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults Recommendations are expected to be published in 2011 and they will be based on the most extensive review of the scientific literature to date (NHLBI 2010).

Successful management of the obese patient involves multiple treatment strategies, most focusing on modification of the patient's lifestyle (e.g., diet and physical activity habits). Behaviour modification, although not an intervention itself, is a systematic method for modifying eating, exercise or other behaviours that may contribute to or maintain obesity (Wadden 2004).

History of Effectiveness of Behavioural Modification in Obesity

Behavioural approaches were first applied to the problem of obesity in the late 1960's and early 1970's (Wadden et al 1994). Initial programmes were 10-weeks in length, directed at mildly overweight individuals, and tended to focus on behaviours such as the time of day and location of eating episodes, rather than the actual calories consumed. These programmes produced average weight losses of approximately 4.5 kg during the 10-week programme. Over time, treatment programmes have been lengthened to 20-24 weeks; maintenance interventions have been added; there has been increased emphasis on physical activity; and both diet and activity have been viewed in terms of their contribution to calorie balance. With these newer programmes, weight loss has increased to approximately 9-10 kg at 6 months. Patients maintain asession 60-70% of their weight loss (or 5.6 kg) at 1-year follow-up.

Even though reserved, the weight losses achieved in a behaviour modification programme are enough to recover cardiovascular risk factors and reduce the risk of developing diabetes (Wing et al 1987; Vendititi et al 2007). According to these authors since most obese patients with type II diabetes are unable to achieve ideal body weight, this study examined whether more modest weight losses would provide a long-term benefit. Type II diabetic patients (N = 114) were treated in a behavioural weight control programme and followed up for one year. Weight loss was significantly correlated with progress in glycosylated hemoglobin values at post treatment (r = 0.55) and one year (r = 0.51). Patients who lost more than 6.9 kg or had more than 5% reduction in body weight had significant improvements in glycosylated hemoglobin values at one year, while patients losing less weight had no significant changes and those gaining weight had significant worsening. Thus, reserved weight loss can have a long-term impact on glycemic control. However, the improvement in glycemic control for a given weight loss was greater initially than at one year, suggesting that energy restriction, in addition to weight loss, may contribute to initial improvement. Neither percent overweight nor diabetes treatment affected weight loss.

In another study (Wing et al 1998) in order to assess the effect of lifestyle intervention over 2 years on changes in weight, coronary heart disease (CHD) risk factors, and incidence of diabetes in overweight individuals with a parental history of diabetes. In this study participants (N = 154), who were 30-100% over ideal body weight, had one or both parents with diabetes, and were non diabetic at the time, were randomly assigned to 2-year treatments focused on diet (decreasing calories and fat intake), exercise (goal of 1,500 kcal/week of moderate activity), or the combination of diet plus exercise or to a no-treatment control group. Subjects were reassessed at 6 months, 1 year, and 2 years. The results showed that at 6 months, the groups differed significantly on measures of eating, exercise, and fitness; weight losses in the diet and diet-plus-exercise groups were significantly greater than in the exercise and control conditions. Weight losses were associated with positive changes in CHD risk factors. After 6 months, there was gradual deterioration of behavioural and physiological changes, so that at 2 years, almost no between-group differences were maintained. Differences between groups in risk of developing diabetes were of borderline significance (P = 0.08). Strongest predictors were impaired glucose tolerance at baseline, which was positively related to risk of developing diabetes, and weight loss from baseline to 2 years, which was negatively related; in all treatment groups, a modest weight loss of 4.5 kg reduced the risk of type 2 diabetes by approximately 30% compared with no weight loss. Concluding, although initially successful, the interventions studied here were not effective in producing long-term changes in behaviour, weight, or physiological parameters. However, weight loss from 0 to 2 years reduced the risk of developing type II diabetes. Since modest weight loss significantly reduced risk of type II diabetes, further research is needed to determine how to best increase the percentage of subjects achieving at least a modest weight loss.

Positive mood changes have also been observed in participants in behavioural weight loss programmes (Wing et al 1991). In this study, the psychological responses of obese type II diabetic subjects to very-low-calorie diet were examined. Very-low-calorie diets have been shown to produce dramatic improvements in glycemic control in obese subjects with non-insulin-dependent (type II) diabetes. There have been no studies of the psychological responses of diabetic subjects to these diets. This study (ibid) examined

alterations in hunger, depression, and anxiety in 33 obese type II diabetic subjects who were randomly assigned to behaviour modification programmes that used either a balanced diet of 4185-6277 KJ/day (1000-1500 kcal/day) throughout or included an 8 week period of a very-low-calorie diet (1674 KJ/day or 400 kcal/day of lean meat, fish, or fowl). The result of both groups experienced major advances in depression status, anxiety, and reduction of hunger during the course of the programme, with no significant differences observed between the balanced diet and the very-low-calorie diet groups. In conclusion very-low-calorie diets, used in the context of a behavioural weight-control programme, result in reductions in hunger and improvements in mood state comparable to those observed on more moderate weight-loss regimens.

Health professionals can integrate several significant aspects of behavioural therapy in their office practice to enhance their weight management treatment approach (NHLBI, 2000). The most vital principle is to provide a treatment plan that involves short-term and achievable goals. These goals should be adjusted as needed based on the patient's response. Recurrent patient contact, particularly during the initial 6 months of therapy, improves motivation and provides the opportunity to assess progress, give support, and establish goals for the next visit. Contact is needed with all the health professionals involved in order to offer effective patient interactions as well. The use of written materials and manuals, and appropriate websites also provides educational support but reduces the burden on office manpower (ibid).

Behavioural modification approaches for weight management

Behaviour modification interventions last about 18 weeks and usually include multiple treatment strategies. Patients are able to maintain, on average, about two thirds of their initial weight loss nine to 10 months after treatment termination (Wing et al 1998). Studies consistently show that behaviour modification strategies, extended treatment and physical activity are excellent predictors of weight loss during treatment (Kayman et al 1990).

Behavioural approaches to obesity are based on two assumptions: first, that eating and exercise behaviours are related to body weight and second, that behaviours can be

modified by changing both the antecedents, or cues in the environment, that come before the behaviour and lead to its occurrence, and the consequences, or reinforcements, that come after the behaviour and increase its frequency (Wing et al 1998). Based on these premises, there are three main components to a behavioural approach, designed to assess the behaviours and to change the antecedents and consequences controlling the behaviours. In order to determine the behaviours that need to be changed and to assess progress in making these changes, it is necessary to find a way to monitor behaviour. In weight loss programmes, eating and exercise behaviours are typically monitored by self-report. Patients are asked to write down all foods consumed and the calories and fat grams in those foods and all recreational physical activities that are performed. Although these reports may underestimate intake or overestimate activity (Litchman et al 1992), they can be used by the patients and therapist to identify particular problem areas (e.g. is the participant consuming large portion sizes, selecting high fat choices, etc.), and to estimate progress. According to Lichtman et al (1992) some obese subjects repeatedly fail to lose weight even though they report restricting their caloric intake to less than 1200 kcal per day. They studied two explanations for this apparent resistance to diet: (a) low total energy expenditure and (b) under-reporting/under-estimating of caloric intake, in 224 consecutive obese subjects presenting for treatment. Group 1 consisted of nine women and one man with a history of diet resistance in whom they evaluated total energy expenditure and its main thermogenic components and actual energy intake for 14 days by indirect calorimetry and analysis of body composition. Group 2, subgroups of which served as controls in the various evaluations, consisted of 67 women and 13 men with no history of diet resistance. The results of this study indicated that total energy expenditure and resting metabolic rate in the subjects with diet resistance (group 1) were within 5 percent of the predicted values for body composition, and there was no significant difference between groups 1 and 2 in the thermic effects of food and exercise. Low energy expenditure was thus excluded as a mechanism of self-reported diet resistance. In contrast, the subjects in group 1 under-reported their actual food intake by an average (± SD) of 47 ± 16 percent and over reported their physical activity by 51 ± 75 percent. Although the subjects in group 1 had no distinct psychopathologic characteristics, they perceived a genetic cause for their obesity, used thyroid medication at a high frequency, and described their eating behaviour as relatively

normal (all $P < 0.05$ as compared with group 2). Concluding, the study showed that the failure of some obese subjects to lose weight while eating a diet they report as low in calories is due to an energy intake substantially higher than reported and an overestimation of physical activity, not to an abnormality in thermogenesis.

Behavioural approaches assume that the environment is an important determinant of behaviour. Most notably, the physical environment, including the sight and smell of food, can trigger feelings of hunger and influence what types of foods are selected. Other types of environmental cues can also be important. Eating and exercise behaviours can be influenced by social cues (the behaviours or attitudes of others around the patient) and by cognitive cues (thoughts and feelings about eating, exercise and body weight). Thus behavioural approaches include techniques to change physical, social, and cognitive cues. The third key component of a behavioural programme is increasing reinforces for new, appropriate behaviours. Patients are taught to recognize small positive changes in their behaviour and to reward themselves verbally and with small tangible rewards for this progress. Therapist praise and social support from others in the treatment programme are also used as reinforcement.

Behavioural approaches are used to help patients make long-term changes in their eating and exercise behaviours. To accomplish this, behavioural approaches stress monitoring of dietary intake and physical activity and modifying the cues and reinforcement in the environment. Better results have been achieved in behavioural programmes that provide longer periods of treatment contact, more structured approaches to modifying dietary intake and higher goals for physical activity. Current practice guidelines for management of overweight and obesity recommend a programme of diet, exercise, and behaviour therapy for all persons with a body mass index (calculated as kg/m^2) of at least 30 (and those with body mass index > or =25 plus two weight-related comorbidities). In this tripartite treatment--often referred to as lifestyle modification--behaviour therapy provides a structure that facilitates meeting goals for energy intake and expenditure. Although standard behaviour therapy reliably induces mean weight losses of approximately 10% of initial weight, these reductions are difficult to maintain.

Fabricatore et al (2009) argue that a shift in focus from behaviour change to cognitive change will improve long-term results of lifestyle modification programmes. This review (ibid) describes, in detail, the standard behavioural treatment of obesity and compares it with an alternative treatment model that is based on a cognitive conceptualization of weight control. Brennan et al (2000) suggested that the diversities between standard behaviour therapy and cognitive-behavioural therapy of obesity are being positioned more in their underlying theories than in their implementation.

Behavioural modification programmes for weight management

Behavioural programmes are typically conducted in groups. Programmes are often led by two co-therapists, with multidisciplinary backgrounds, such as psychologists, nutritionists, or exercise physiologists. Programmes usually include weekly treatment meetings for 6 months and biweekly or monthly meetings for the remainder of the year to two years. Behavioural programmes that have included weekly meetings for a full year have been quite successful, but decreased attendance over time limits the usefulness of this approach (Wing et al 1994; Wadden et al 1994; Wadden et al 2004).

In some situations, behavioural treatments are offered individually to patients or using a combination of group and individual approaches. Renjilian's (2001) study suggested that group intervention was more effective than individual intervention even among patients who expressed a preference for individual therapy. Group treatment is also clearly less expensive to provide. Individual versus group therapy for obesity: effects of matching participants to their treatment preferences.

In this study (ibid) the effects of matching participants to treatments on the basis of their preferences for either individual or group therapy for obesity were examined. Seventy-five obese adults who expressed a clear preference for either individual or group therapy were randomly assigned to either their preferred or their non preferred treatment modality within a 2 (individual vs. group therapy) x 2 (preferred vs. non preferred modality) factorial design. At post treatment, group therapy produced significantly greater reductions in weight and body mass than individual therapy, and no marked effects were

observed for treatment preference or the interaction for treatment preference by type of therapy. All treatment conditions demonstrated equal upgrading in psychological functioning. These findings suggested that group therapy produces greater weight loss than individual therapy, even among those clients who express a preference for individual treatment.

Constant contact is an important component of the maintenance programme (Perri et al 1988). In a programme that provided 6-months of weekly treatment and then no further contact over the subsequent year, patients retained a weight loss of 4.5 kg, whereas patients in programmes that continued to provide biweekly meetings throughout the year, maintained weight losses of 13.6 kg (ibid). Attempts to make available on-going contact through telephone calls, rather than face-to-face meetings have had contradictory effects (Perri et al 1994; Wing et al 1996), whereas results may depend on the nature of the calls and specifically on the amount of therapist involvement and problem solving that is conducted. Recently there have been efforts to deliver behavioural treatment programmes via television or the Internet. Two studies of televised behavioural programmes suggest that this approach may be as effective as face-to-face programmes (Meyers 1996).

The experiment evaluated the efficiency of television delivery of a behavioural weight reduction programme. Seventy-one overweight adults were randomly assigned to a live-contact weight loss group that was videotaped for viewing by other groups, a live-contact group that was not videotaped, a television-delivered group that observed the videotaped weight loss sessions, or a waiting-list control group. Participants in all 3 treatment groups lost significantly more weight during the 8-week treatment programme than those in the waiting-list control group. There were no considerable weight loss differences among the 3 treatment groups during the programme. These weight changes were maintained at 3-month follow-up. At 15-month follow-up, the television-delivered group and the live-contact group maintained their weight losses, whereas the videotaped group did not. Cost-effectiveness analyses indicated that the television-delivered group received the most cost-effective treatment.

Another research studied (Tate et al 2001) a randomized controlled trial of an Internet behaviour therapy programme. Patients in the Internet education group (control group) were helped to identify appropriate web sites related to diet, exercise, and weight management. For patients in the Internet behaviour therapy programme, this educational material was supplemented by treatment lessons, weekly e-mail contact between patients and the therapist (patients submitted a diary of their weekly calorie intake, exercise, and weight and the therapist provided supportive feedback) and a bulletin-board for sharing information. The Internet education group lost 1.6 kg at 6 months, compared to 4 kg in the Internet behaviour therapy group. Fast increases in access to the Internet have made it a viable mode for public health intervention. No controlled studies have evaluated this resource for weight loss. This study managed to determine whether a structured Internet behavioural weight loss programme produces greater initial weight loss and changes in waist circumference than a weight loss education Web site. The design of the study was randomized, controlled trial. Ninety-one healthy, overweight adult hospital employees aged 18 to 60 years with a body mass index of 25 to 36 kg/m^2 participated. Analyses were performed for the 65 who had complete follow-up data (ibid).

Interventions participants were randomly assigned to a 6-month weight loss programme of either Internet education (education; N = 32 with complete data) or Internet behaviour therapy (behaviour therapy; N = 33 with complete data). All participants were given one face-to-face group weight loss session and access to a Web site with organized links to Internet weight loss resources. Participants in the behaviour therapy group received additional behavioural procedures, including a sequence of 24 weekly behavioural lessons via e-mail, weekly online submission of self-monitoring diaries with individualized therapist feedback via e-mail, and an online bulletin board. According to the study the body weight and waist circumference, measured at 0, 3, and 6 months, were the parameters of comparison between the 2 intervention groups. Repeated-measures analyses showed that the behaviour therapy group lost more weight than the education group (P = 0.005). The behaviour therapy group lost a mean (SD) of 4.0 (2.8) kg by 3 months and 4.1 (4.5) kg by 6 months. Weight loss in the education group was 1.7 (2.7) kg at 3 months and 1.6 (3.3) kg by 6 months. More participants in the behaviour therapy

than in the education group achieved the 5% weight loss goal (45% vs 22%; P = 0.05) by 6 months. Changes in waist circumference were also greater in the behaviour therapy group than in the education group at both 3 months (P = 0.001) and 6 months (P = 0.005). Concluding, participants who were given a structured behavioural treatment programme with weekly contact and individualized feedback had better weight loss compared with those given links to educational Web sites. Thus, the Internet and e-mail appear to be viable methods for delivery of structured behavioural weight loss programmes (ibid).

The content of behavioural treatment programmes has developed into comparatively uniform. Group sessions typically include an individual, private weigh-in, review of self-monitoring records, and then a presentation of the lesson for the week. Participants are given specific assignments to complete over the subsequent week, which are then reviewed at the following lesson.

The NHLBI Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults-The Evidence Report (NHLBI 2000) recommends that individuals with a BMI >25 (overweight) and those with a BMI >30 (obese) be counselled on the importance of weight management. Cardiovascular risk factors should be assessed, and weight loss recommended to those with a BMI >30 or a BMI 25-29.9 or waist circumference >80 cm (F) or > 102 cm (M) AND > 2 risk factors. The initial goal of therapy should be to achieve a 10% reduction in body weight. Patients should be encouraged to lose 1-2 lb/week and thus should be able to achieve 10% reduction within the first 6 months of treatment. Subsequently, efforts should be directed at maintaining the weight loss. Studies suggest that patients often desire to achieve much greater weight losses than this 10% goal (Foster et al 2001).

There are different perceptions of Treatment Outcomes and the Factors That Influence Them regarding the obese patients. Despite considerable professional consensus (ibid) that modest weight losses of 5% to 10% are successful for reducing the co-morbid conditions associated with obesity, obese patients often desire weight losses 2 to 3 times greater than this. Examining ways to reduce the disparities between treatment expectations and subsequent outcomes, this study evaluated the role of physical

characteristics, treatment setting, and mood in patients' evaluations of treatment outcomes. This study (ibid) was conducted in a university outpatient weight loss clinic with a sample of 397 obese individuals seeking weight loss by a variety of modalities. Before treatment, participants' heights and weights were measured, and the Beck Depression Inventory and the Goals and Relative Weight Questionnaire were administered. Outcome evaluations ranged from 64.4 ± 11.1 kg (mean ± SD) for dream weight to 90.1 ± 19.1 kg for disappointed weight. Initial body weight was the strongest predictor of disappointed, acceptable, and happy weights (β = 0.90, 0.76, and 0.57, respectively). Sex (β = -0.37) and height (β = 0.37) were the strongest determinants of dream weight. Heavier participants chose higher absolute weights, but the weight loss required to reach each of the outcomes was greater for heavier than for lighter patients. These data signal a therapeutic dilemma in which the amount of weight loss produced by the best behavioural and/or pharmacological treatments is viewed as even less than disappointing. Patients with the highest pre-treatment weights are likely to have the most unrealistic expectations for success.

What patients report as a desired weight would be achieved by a 38% reduction in body weight; a weight that would make them happy, would be achieved by a 31% reduction in weight; a weight that would be satisfactory would be achieved by a 25% weight loss, and a weight that they would be disappointed to achieve would be accomplished by a 15.7% weight loss. It is important to counsel patients on achievable weight losses and attempt to reduce the discrepancy between the desired and the achievable outcomes (Wing et al 2001).

Behavioural weight control programmes typically weigh patients at every group meeting and record this information. In addition, patients are instructed to weight themselves at home at regular intervals, either daily or at least once a week. Data from the National Weight Control Registry suggest that successful weight losers monitor their weight quite closely (Klem et al 1997).

The National Weight Control Registry (NWCR) is one of the largest studies of individuals successful at long-term maintenance of weight loss. Despite extensive

histories of overweight, the 629 women and 155 men in the registry lost an average of 30 kg and maintained a required minimum weight loss of 13.6 kg for 5 years. Just over one-half of the sample lost weight through formal programmes; the remainder lost weight on their own. Both groups reported having used both diet and exercise to lose weight and nearly 77% of the sample reported that a triggering event had preceded their successful weight loss. Mean (± SD) current consumption reported by registry members was 5778 ± 2200 kJ/d, with 24 ± 9% of energy from fat. Members also appear to be highly active: they reported expending approximately 11830 kJ/wk through physical activity. Surprisingly, 42% of the sample reported that maintaining their weight loss was less difficult than losing weight. Nearly all registry members indicated that weight loss led to improvements in their level of energy, physical mobility, general mood, self-confidence, and physical health. The NWCR identified a large sample of individuals who were highly successful at maintaining weight loss. In reflection, other studies are needed to be contacted to determine variables that predict continued maintenance of weight loss.

Participants in behavioural programmes are instructed to record all food and beverages they consume and the calories and fat grams in those foods. By tallying their fat and calorie intake after each meal, participants can gauge the amount remaining for later meals. Such self-monitoring is prescribed daily for the first 6 months of the programme and at least one week per month subsequently. Continued self-monitoring of intake is one of the strongest predictors regarding weight loss maintenance (Guare et al 1989;Wadden et al 1992; Wadden 2004). The components of the different parts of behaviour modification are presented and explained at table 5.

Table 5- Component s of Behaviour Modification

Component	Description	Examples
Self-monitoring	Recording of target behaviours and factors associated with behaviours	Food and exercise records, moods and environment associated with overeating
Stimulus control	Restricting environmental factors associated with inappropriate behaviours	Keep away from high-fat foods; eat at specific times and places; set aside time and place for exercise
Contingency management	Rewarding appropriate behaviours	Give prizes for achieving exercise goals
Changing behaviour parameters	Directly altering target behaviour topology	Slow down eating; self-regulate exercise
Cognitive-behaviour modification	Changing thinking patterns related to target behaviours	Counter social pressure to be thin to reduce temptation to diet

Source: Foreyt and Goodrick 2004 pp 698-701

Self-monitoring is the core of all behavioural programmes and consists of self-observation and self-recording of those observations. The situational factors, behaviours, thoughts, and feelings that occur before, during, and after attempts at prudent eating and exercise behaviours are recorded. Self-monitoring may prevent inappropriate behaviour because the patients know that their recorded indiscretions will be scrutinized by a therapist or peer (Foreyt et al 2004). Studies by Perri et al (1988) found that patients spontaneously reduced calorie intake when daily diet records were kept. Patients who monitored their caloric intake and expenditure lost more weight than those who did not use self-monitoring. Several studies have found good correlations between self-monitoring and weight loss (Perri et al 1988; Dubbert 1984) and maintenance (Kayman et al 1990; Hartman et al (1990), although self-monitoring and success could both be caused by a third motivational factor (Foreyt et al 2004). In reflection to the current study (DProf) the subjects participating in the project were required to keep both food and activity diaries.

Stimulus control involves the modification of cues leading to inappropriate eating or inadequate exercise. Early theories suggested that obese persons were particularly sensitive to environmental cues and less sensitive than non obese persons to internal, hunger cues (Rodin et al 1981). Later research indicated that such sensitivity is not confined to obese persons and that not all obese persons are particularly sensitive (Rodin 2002). Although little research has compared behavioural treatments with and without stimulus control, the concept of controlling the environment is widely accepted as clinically effective. Control of food cues may help eating management because introduction to such cues has been shown to produce physiologic reactions such as insulin shifts, which may predispose one to overeat (Wilfley 1998).

Contingency management will be used in order to involve the application of rewards for appropriate behavioural patterns leading to weight loss or maintenance (for example, buy a clothing accessory for achieving the weight goal). Contracts will be used to formalize agreements. Contracts will be short term and should focus on increasing healthful behaviours associated with weight loss rather than on weight loss itself. The effectiveness of contingency management usually ends when the rewards end. Initially, changes in eating and exercise habits may be essentially aversive in such cases, artificial rewards for adherence are needed. Later, as the new eating and exercise behaviours become apparent as enjoyable and intrinsically rewarding, the contracts can be allowed to expire.

Alterations in behaviour topology through modification of the speed or intensity of target behaviours may be needed to optimize outcome. After all, reductions in the rate of eating in response to behaviour therapy have been positively correlated with weight loss in the short term (Spiegel 1991). Gradual modification of eating behaviours away from dieting and meal skipping toward more normal eating patterns (three meals a day) using a gradual substitution of lower-fat alternatives may be needed to avoid feelings of deprivation that could trigger lapses in eating control. Equally, healthful exercise habits will be developed gradually to allow for cardiorespiratory adaptation and to avoid the subject's perception that exercise is punishment.

Cognitive-behavioural strategies will be used to help move thinking patterns away from self-rejection and toward self-acceptance. The focus will be on the ways in which thoughts, moods, diets, and social pressure to be thin, affect eating control. Asession 40% of all obese patients seeking treatment suffer from binge-eating disorder, characterized by frequent and uncontrollable episodes of binge eating (Spitzer 1993). Cognitive-behavioural treatment for binge eating has been shown to be effective (Telch et al 1990) and may need to precede behavioural treatment of obesity. An approach using cognitive-behaviour treatment to reduce restrictive dieting appears to have alleviated much of the psychological distress associated with obesity (Foreyt et al 2004). The joint project at issue of this document aimed to determine whether such methods are effective in promoting and maintaining weight loss.

During the process of reviewing different scientific articles in Cyprus and Greece on obesity (Savva et al 2005), (Manios & Kafatos et al 2006), (Trichopoulou et al 2005), considerable appreciation was gained for the fact that there is an urgent need for further study into behavioural modification in nutrition and physical activity habits, and that there are no such studies in Cyprus and no guidelines and protocols currently available for the Cypriot population.

DIET/EATING HABITS

Behavioural programmes attempt to change energy balance by influencing both calorie intake and calorie expenditure. Most programmes emphasize decreasing overall calorie intake and restricting fats specifically. At the start of the programme, participants are assigned a calorie goal designed to produce a 1-2 lb/week (½-1 kg/week) weight loss. This may be done on an individual basis, by estimating current calorie intake and then subtracting 500 to 1000 kcal/day. In some studies current intake is estimated by multiplying the patients' weight in pounds (lbs) by 12, and in others resting energy expenditure is estimated and an adjustment made for the patient's activity level. Alternatively in many programmes, participants are simply assigned a calorie goal depending on their initial body weight (e.g. patients < 200 lb (<91kg) may be asked to eat 1000-1200 kcal/day and those > 200 lb (>91kg) may be asked to eat 1500 kcal/day). Very

low calorie diets, which are diets of <800 kcal/day, were extremely popular in the 1980's (NTFPTO 1993).

According to a literature National Task Force on the Prevention and Treatment of Obesity (1993, 2003) aimed to provide an overview of the published scientific information on the safety and efficacy of Very Low-Calorie Diets (VLCDs) and to provide rational recommendations for their use. VLCDs were usually provided in the context of comprehensive treatment programmes, during which usual food intake is completely replaced by specific foods or liquid formulas containing 3350 kJ/d (800 kcal/d) or less. Weight loss on VLCDs averages 1.5 to 2.5 kg/wk; total loss after 12 to 16 weeks averages 20 kg. These results are superior to standard low-calorie diets of 5020 kJ/d (1200 kcal/d), which lead to weight losses of 0.4 to 0.5 kg/wk and an average total loss of only 6 to 8 kg. There is little evidence that intakes of less than 3350 kJ/d (800 kcal/d) result in better weight losses than those of 3350 kJ. Intake of at least 1 g/kg of ideal body weight per day of protein of high biological value appears to be important in helping to preserve lean body mass. Serious complications of modern VLCDs are unusual, cholelithiasis being most common. Conclusively VLCDs are generally safe when used under proper medical supervision in moderately and severely obese patients (BMI > 30) and are usually effective in promoting significant short-term weight loss, with concomitant improvement in obesity-related conditions. Long-term maintenance of weight lost with VLCDs is not very satisfactory and is no better than with other forms of obesity treatment. Incorporation of behavioural therapy and physical activity in VLCD treatment programmes seems to improve maintenance. These diets are usually consumed as liquid formula or lean meat, fish and fowl. Patients were found to lose an average of 9 kg in 12 weeks on these regimens. However, after stopping the diet, regain was common. Therefore, several studies (Wing et al 1991) were designed to examine the combination of very low calorie diets and behaviour modification, reasoning that VLCD might increase initial weight loss and the behavioural strategies might improve maintenance of weight loss. This reasoning was supported in part; the combination of behaviour modification plus VLCD was found to be more effective than VLCD alone. However, behaviour modification plus VLCD was not more effective than behaviour modification

with a low calorie diet (1200-1500 kcal/day). Combining behaviour modification with a VLCD increased initial weight loss, but despite the behavioural training, these patients still regained large amounts of weight over the year of follow-up so that at the end of the study (2-year follow-up), weight losses of patients treated with VLCD did not differ from patients with low calorie diets. Given these results, along with concern regarding health consequences of rapid weight loss, the expense of using VLCDs, and the evidence that weight losses are comparable on liquid diets of 400, 600 and 800 kcal/day, most weight loss programmes now use higher calorie levels (>800 kcal/day). Many behavioural programmes encourage patients not only to reduce their overall calories, but also to lower their fat intake to 20-30% of their calories in order to improve weight loss and lipid responses to weight loss. The combination of restricting dietary fat and calories has been shown to be more effective than fat restriction alone (Schlundt et al 1993) or calorie restriction alone (Pascale et al 1995). Schlundt (1993) examined a low fat with a free access (*ad libitum)* to carbohydrate diet for weight reduction. Fifty two females and eight males (60 totals) were randomized to low fat with free feeding to carbohydrate (low-fat) or low fat with caloric control (low-calorie) behaviour modification treatments. Forty nine subjects ended the 16-20 week programme. Subjects in both groups stated an average of over five exercise sessions per week during treatment. The low calorie group lost significantly more weight (males 11.8 kg, s.d. 6.4; females 8.2 kg, s.d. 4.2) than the low-fat group (males 8.0 kg, s.d. 1.3; females 3.9 kg, s.d. 3.7). Both groups lost analogous amounts of lean body mass. There was considerably greater loss of body fat in the low-calorie group. Fat intake was decreased from 90 to 30 g per day. Subjects in both groups decreased their total energy intake with the low-calorie group consuming fewer calories per day than the low-fat group. Both groups showed important and comparable progresses in eating habits derived from nutrient analysis of eating diaries. Nevertheless, eating socially and emotionally continued to cause obedience problems during treatment for both groups. On the other hand, Hays et al (2004) at other study showed that a high-carbohydrate diet (18% fat, 19% protein, 63% carbohydrates, and 26 g of fiber per 1000 kcal), consumed at free access, with no effort at calorie control or alter in energy consumption, caused weight loss and body fat reduction in older men and women.

Pascale et al (1995) studied the effects of a behavioural weight loss programme stressing calorie restriction versus calorie plus fat restriction in obese individuals with NIDDM or a family history of diabetes. The aim of this randomized trial was to compare the effects of a behavioural intervention focusing on calorie restriction alone or calorie plus fat restriction on weight loss and changes in lipids and glycemic control in individuals with non-insulin-dependent diabetes mellitus (NIDDM) or a family history of diabetes. They recruited 44 obese women with NIDDM and 46 obese women with a family history of NIDDM and randomly assigned these subjects to calorie restriction (CAL) or to calorie plus fat restriction (CAL + FAT). All subjects participated in a 16-week behavioural weight loss programme, with training in diet, exercise, and behaviour modification. Subjects assigned to the CAL condition were given a 1,000-1,500 kcal/day goal and self-monitored calories consumed. Subjects assigned to the CAL+FAT condition had the same calorie goal, but were also given a fat goal (grams of fat/day), to produce a diet with < 20% of calories from fat; this group monitored both calories and fat grams. Among NIDDM subjects, weight loss of the subjects in the CAL+FAT condition was significantly greater than subjects in the CAL condition (7.7 vs. 4.6 kg) and the CAL+FAT condition group also maintained their weight loss better at the one-year follow-up (5.2 vs. 1.0 kg). Noteworthy reductions in glucose, low-density lipoprotein (LDL) cholesterol and total cholesterol were noted after 16 weeks of treatment among NIDDM subjects; these changes were similar in CAL and CAL+FAT groups, but a greater proportion of subjects in CAL condition required oral hypoglycemic medication. At the one-year follow-up, all parameters had returned to baseline. Minor changes in weight loss or physiological changes were seen between CAL and CAL+FAT conditions in subjects with a family history of diabetes. These results proposed that using the mixture of calorie and fat restriction may encourage weight loss in obese NIDDM patients. No other long-term benefits of this regimen were observed (ibid).

Moreover, reducing fat intake and decreasing consumption of specific high fat food (beef, hot dogs, cheese, fried potatoes, and sweets) have been shown to be related to maintenance of weight loss (Holden et al 1992; Harris et al 1994).

Holden et al (1992) studied the long-term follow-up of patients attending a combination of a very-low calorie diet and behaviour therapy weight loss programme. They examined the effects of treatment with VLCD combined with behaviour modification on weight loss and long-term maintenance of weight loss in 118 of 199 patients who completed eight weeks of VLCD. Harris et al (1994) examined the Dietary and physical activity correlates of long-term weight loss. Co-variations in body mass index (BMI), physical activity, macronutrient intake, and the frequency of consumption of specific foods were examined among 82 men and 75 women participating in a behavioural weight loss programme over a period of 18 months. Results of repeated measures analyses of covariance showed that BMI change was inversely related to change in physical activity and change in frequency of vegetable consumption. BMI change was positively related to change in calorie intake from fat and change in frequency of consumption of beef, hot dogs, and sweets. Change in fat calories predicted BMI change better than change in total calories. In addition, change in the frequency of consumption of specific foods accounted for a larger percentage of the variance in BMI change than did change in macronutrients (10.4% vs. 5.2%). No differences were found between predictors of weight loss vs. weight maintenance. For simplicity, participants are given a fat goal in grams of fat/day (e.g. participants on a 1200 kcal diet are instructed to consume 27-40 grams of fat for a diet of 20% - 30% fat).

Wing and Hill (2001) defined successful long-term weight loss and maintenance as the purposely loss of at least 10% of initial body weight and maintaining it for at least 1 year. Based to this definition greater than 20% of overweight/obese persons were able to be successful on their weight loss process. In the National Weight Control Registry, successful long-term weight loss maintainers (average weight loss of 30 kg for an average of 5.5 years) shared common behavioural strategies, including eating a diet low in fat, frequent self-monitoring of body weight and food intake, and high levels of regular physical activity. Once these successful maintainers had maintained a weight loss for 2–5 years, the chances of longer-term achievement greatly increase. These individuals stated that they continued to eat a diet low in calories (1380 kcal/day) and low in fat (24% of calories from fat). Almost 80% of participants confirmed eating breakfast every day

during the week and only 4% reported never eating breakfast. Despite the recent popularity of diets recommending low carbohydrate intake, less than 1% of registry participants reported consuming <24% of their diet as carbohydrate (< 90 g of carbohydrate on a 1500 kcal regimen).

To identify the behaviour-change strategies that were most evidently related to weight loss, 106 patients with type II (non-insulin-dependent) diabetes completed the Eating Behaviour Inventory (EBI) before and after participating in a behavioural weight-loss programme and at one-year follow-up (Thompson 2007). The EBI is a standardized questionnaire that assesses behavioural strategies typically taught in a behavioural weight-loss programme. Pre- treatment scores on the EBI were not related to weight-loss outcome, but changes on the EBI in the direction of more frequent use of appropriate strategies were related to weight loss at both post treatment and one-year follow-up. Specific strategies related to weight loss at both times were: consuming foods that help in losing weight, recording foods eaten, refusing food offered by others, and being able to stop eating when appropriate. Nevertheless, few patients maintained frequent use of these strategies at follow-up. It is concluded that weight-loss programmes should focus on the strategies most strongly related to weight loss and try to improve long-term use of these techniques (ibid).

Patients in behavioural weight loss programmes were encouraged to select foods that provided the greatest nutritional benefit for the fewest calories. The stress is on decreasing overall intake of fat. Strategies are provided for improving quality of foods consumed at home and when eating out. For example, patients are taught to substitute lower calorie items for higher calorie alternatives, to restrict use of fat in cooking and flavouring of foods, and to modify favourite recipes for healthier eating. Furthermore providing increased structure regarding diet was considered an issue for behavioural modification in eating habits and exercise. There have been several studies suggesting that providing structure to patients on what they should eat, and thereby simplifying choices, preparation time, etc., could be very helpful in promoting dietary adherence (Jeffery et al 1993; Wing et al 1996; Metz et al 2000). Jeffery et al (1993) presented

ways to strengthen behavioural interventions for weight loss: a randomized trial of food provision and monetary incentives**.** Behavioural treatments for obesity seek to modify eating and exercise behaviours by a change in their antecedents and consequences. More direct modification of antecedents and consequences by (a) the provision of food to patients and (b) the provision of financial rewards for weight loss was hypothesized to improve treatment outcomes. Two hundred and two men and women were randomly assigned to no treatment, standard behavioural treatment (SBT), SBT plus food provision, SBT plus incentives, or SBT plus food provision and incentives. The major finding Of this study (ibid) was that food provision significantly enhanced weight loss. Weight losses with SBT averaged 7.7, 4.5, and 4.1 kg at 6, 12, and 18 months, respectively, compared with 10.1, 9.1, and 6.4 kg, respectively, at the same intervals with the addition of food. Food provision also enhanced attendance, completion of food records, quality of diet, and nutrition knowledge. The conclusion of this study was that the provision of food to weight-loss patients was a promising methodology that deserved further exploration.

Wing et al (1996) compared the food provision vs structured meal plans in the behavioural treatment of obesity. Providing overweight patients with the food they should eat has been shown to significantly improve weight loss in a behavioural treatment programme. The objective of this study was to examine the contribution of three components of food provision to these positive effects: the specific meal plans indicating what foods should be eaten at each meal; the food itself; and the fact that the food was provided free. The sample of the study consisted of 163 overweight women. The design was a randomized, controlled study with subjects assigned to one of four conditions: (1) a standard behavioural treatment programme (SBT) with weekly meetings for six months; (2) SBT plus structured meal plans and grocery lists; (3) SBT plus meal plans plus food provision, with subjects sharing the cost; or (4) SBT plus meal plans plus free food provision. Subjects in Group 1 lost significantly less weight than subjects in Groups 2-4 at the end of the six month programme (-8.0 kg vs -12.0, -11.7 and -11.4 kg respectively) and at follow-up one year later (-3.3 kg vs. -6.9, -7.5 and -6.6 kg respectively). No significant differences were seen in weight loss between Groups 2-4, suggesting that the component of food provision that is responsible for its success is the provision of highly

structured meal plans and grocery lists. Subjects receiving meal plans were more likely to exhibit an eating pattern of three meals per day, had more specific plans regarding what to eat and stated more constructive changes in foods stored in their homes and in perceived barriers to weight loss. Four RCTs, three of positive quality (Ashley et al 2001; Metz et al 2000; Wing et al 1996) and one of neutral quality (described in Ditschuneit et al 1999)), assessed the efficacy of various types of meal replacement or structured meal plan strategies, used as a component of a behaviour programme, as compared to self-selected diets in middle-aged adults. They concluded that by providing structured meal plans and grocery lists improves outcome in a behavioural weight control programme; no further benefit is seen by actually giving food to patients.

In another study (Metz et al 2000) they assess the long-term effects of a pre-packaged, nutritionally complete, prepared meal plan compared with a usual-care diet (UCD) on weight loss and cardiovascular risk factors in overweight and obese persons. In this randomized multicenter study, 302 persons with hypertension and dyslipidemia (N = 183) or with type II diabetes mellitus (N = 119) were randomized to the nutrient-fortified prepared meal plan (approximately 22% energy from fat, 58% from carbohydrate, and 20% from protein) or to a macronutrient-equivalent UCD. The primary outcome measure was weight change. Secondary measures were changes in blood pressure or plasma lipid, lipoprotein, glucose, or glycosylated haemoglobin levels; quality of life; nutrient intake; and dietary compliance. After 1 year, weight change in the hypertension/dyslipidemia group was -5.8 ± 6.8 kg with the prepared meal plan vs -1.7 ± 6.5 kg with the UCD plan ($P<0.001$); for the type II diabetes mellitus group, the change was -3.0 ± 5.4 kg with the prepared meal plan vs -1.0 ± 3.8 kg with the UCD plan ($P<0.001$) (data given as mean ± SD). In both groups, both interventions improved blood pressure, total and low-density lipoprotein cholesterol levels, glycosylated haemoglobin level, and quality of life ($P<0.02$); in the diabetic group, the glucose level was reduced ($P<0.001$). Compared with those in the UCD group, participants with hypertension/dyslipidemia in the prepared meal plan group showed greater improvements in total ($P<0.01$) and high-density lipoprotein ($P<0.03$) cholesterol levels, systolic blood pressure ($P<0.03$), and glucose level ($P<0.03$); in participants with type II diabetes mellitus, there were greater

improvements in glucose (P = 0.046) and glycosylated hemoglobin (P<0.02) levels. The prepared meal plan group also showed greater improvements in quality of life (P<0.05) and compliance (P<0.001) than the UCD group. Concluding, they suggested that long-term dietary interventions induced significant weight loss and improved cardiovascular risk in high-risk patients. The prepared meal plan simultaneously provided the simplicity and nutrient composition necessary to maintain long-term compliance and to reduce cardiovascular risk.

Patients who were given a box of food containing exactly what they should eat for 5 breakfasts and 5 dinners each week had better weight losses at 6, 12 and 18 months (10.1, 9.1, 6.4 kg, respectively) than patients who were given the comparable calorie and fat goals for these meals but selected the foods on their own (7.7, 4.5, and 4.1 kg, respectively) (Jeffery et al 1993). Providing patients with a specific meal plan, indicating exactly what should be eaten for each meal and a grocery list to purchase these items was also more effective than simply allowing patients to self-select their diet (Wing et al 1996). Providing such meal plans or the actual food to patients appears to remove some of the barriers to dietary adherence, promotes more regular meal consumption and fewer snacks, and positively affects the types of foods stored in the home. Similar positive results have been obtained using pre-packaged entrees for all or part of the diet and using meal replacements (Dischuneit et al 1999). In all of these regimens, patients were eating 900-1500 kcal/day suggesting that it was the structure, rather than an extremely low calorie level that makes these methods successful.

Finally, it is crucial that physicians became more involved in the prevention of obesity. The 13.7% and 11.5% of children and adolescents, respectively, were obese (NHLBI 2000). The major reason for this was that childhood obesity was associated with adult obesity, and physicians should had mediated early with overweight children and their parents. The American Heart Association (AHA) (Foreyt et al 1993) stated that the development of obesity prevention in children was the key to decreasing the current obesity epidemic. The general economic burden of obesity in the US appears to be substantial (Hammond 2010). Even though a complete aggregation across the different

categories of literature is an important goal for future research, simple addition of key effects suggested total annual economic costs associated with obesity in excess of $215 billion. The magnitude of this impact, and the potential for high future impact identified by several studies underscore the importance of the obesity epidemic as a focus for policy and a topic for future research (ibid).

PHYSICAL ACTIVITY

There have been a number of randomized controlled trials comparing the effects on weight loss of diet only, exercise only, and the combination of the two (NHLBI 2002). These studies suggested that exercise alone has very small effects on body weight, and that adding exercise to a diet programme increases initial weight loss by approximately 2 kg. These modest effects of exercise may have been due to the low dose of exercise used in many of these trials and the short duration of the studies. The greatest benefits of exercise are seen in the maintenance of weight loss. Of six studies that have examined long-term weight losses in diet only versus diet plus exercise, all six found that the latter had better outcomes, although in many of these studies the difference was not statistically significant (Wing et al 1999). Correlational data are even stronger in suggesting the benefits of long term physical activity for maintenance of weight loss (Pronk et al 1994).

Researchers (Wing et al 2001; Tate et al 2001) studied how physical activity contributed to the treatment of the adulthood overweight and obesity: current evidence and research issues. This study assessed the effects of 16 weeks of energy restriction and vigorous exercise on body mass and body composition. Sixty sedentary men, mean body mass (mean ± SD) 96.3 (13.9) kg and mean age 42.4 (5.0) years, were randomly assigned to either continue their normal energy intake or restrict energy intake by 4,186 to 6,279 kJ/d. Each group was further randomized to a control light exercise programme or a vigorous exercise programme for 3 half-hour sessions per week. Vigorous exercise improved maximum oxygen consumption (O_2^{max}) by approximately 24% (0.56 [95% confidence interval, 0.47 to 0.65) L_{min}-1, ($P < 0.001$) with no significant changes in body

mass, body composition, or fat distribution. With energy restriction there was a significant reduction in body mass of 10.1 (8.0 to 12.2) kg, lean body mass (LBM) of 2.4 (1.5 to 3.3) kg, fat mass (FM) of 7.7 (5.9 to 9.6) kg, waist to hip ratio (WHR) of 0.03 (0.01 to 0.04), and the sum of 6 skinfolds of 26.9 (15.4 to 38.4) mm ($P < 0.001$). Merging vigorous exercise with energy restriction resulted in no further changes in measures of body composition. They conclude that in sedentary free-living overweight men, 16 weeks of energy restriction, but not vigorous intensity exercise, results in substantial reductions in body mass, LBM, and FM. Furthermore, vigorous intensity exercise when combined with energy restriction did not modify or enhance the changes in body fat distribution or body composition seen with energy restriction alone.

Another study was designed (Jakicic et al 1999) to compare the effects of intermittent with traditional continuous exercise on weight loss, adherence, and fitness, and to examine the effect of combining intermittent exercise with that using home exercise equipment. A total of 148 sedentary, overweight men (mean [SD] body mass index, 32.8 [4.0] kg/m^2) women (mean [SD] age, 36.7 [5.6] years) in a university-based weight control programme were examined. Eighteen-month behavioural weight control programme with 3 groups: long-session exercise (LB), multiple short-session exercise (SB), or multiple short-session exercise with home exercise equipment (SBEQ) using a treadmill. Body weight, body composition, cardio respiratory fitness, and exercise adherence. The results of 148 subjects, 115 (78%) completed the 18-month programme. At 18 months, mean (SD) weight loss was significantly greater in subjects in the SBEQ group compared with subjects in the SB group (-7.4 [7.8] kg vs -3.7 [6.6] kg; $P<0.05$). Mean (SD) weight loss for subjects in the LB group (-5.8 [7.1] kg) was not significantly different than for subjects in the SB or SBEQ groups. Subjects in the SBEQ group maintained a higher level of exercise than subjects in both the SB and LB groups ($P<0.05$) at 13 to 18 months of treatment. All groups showed an increase in cardiorespiratory fitness from baseline to 18 months, with no difference between groups. Mean (SD) weight loss at 18 months was significantly greater in individuals exercising more than 200 min/wk throughout the intervention (-13.1 [8.0] kg) compared with individuals exercising 150 to 200 min/wk (-8.5 [5.8] kg) or less than 150 min/wk (-3.5

[6.5] kg) ($P<0.05$). Compared with the LB group, subjects in the SB group did not experience improved long-term weight loss, exercise participation, or cardiorespiratory fitness. Access to home exercise equipment facilitated the maintenance of SB, which improved long-term weight loss. A dose-response relationship existed between amount of exercise and long-term weight loss in overweight adult women (ibid).

There have been two studies comparing programmes that involve home-based physical activity and those that include supervised exercise programmes (Perri et al 1997; Andersen et al 1997). In these studies, all patients received the same diet and behavioural instruction and the same exercise goals, but the programmes differed in the format used to achieve the physical activity. Both studies found no differences in short-term weight loss, but the maintenance of weight loss was better with home-based exercise than with supervised activity. The advantage of the previous was the independence of the choice to exercise, where and the way they individual wanted (ibid).

Participants in behavioural weight loss programmes are encouraged to increase their physical activity slowly, in order to avoid injury, and to check with their physician before undertaking strenuous activity. The goal for physical activity varies across programmes, but often participants are instructed to gradually increase their activity until they achieve a level of at least 1000 kcal/week. Participants are able to choose exactly what types of exercise they enjoy, but most use walking for the majority of their activity. It is a common practice that walking 1 mile burns approximately 150 kcal (heavier patients will burn more calories). Calories from other types of activities are available in many textbooks, patient guides and on the Internet. Alternatively patients may be assigned a goal of achieving at least 150 minutes/week of physical activity, using brisk walking or activities of similar intensity to brisk walking.

Lifestyle factors related to obesity, eating behaviour, and physical activity play a major role in the prevention and treatment of type II diabetes. There has been progress in the development of behavioural strategies to modify these lifestyle behaviours (Wing et al 1998). Further research, however, is clearly needed, because the rates of obesity

worldwide are escalating, and changing behaviour for the long term has proven to be very difficult. In the article by the National Institute of Diabetes and Digestive and Kidney Diseases (2001) on behavioural science research in diabetes, identifies four key topics related to obesity and physical activity that should be given high priority in future research efforts: 1) environmental factors related to obesity, eating, and physical activity; 2) adoption and maintenance of healthful eating, physical activity, and weight;

3) aetiology of eating and physical activity; and 4) multiple behaviour changes. This review article discusses the significance of each of these four topics, briefly reviews prior research in each area, identifies barriers to progress, and makes specific research recommendations.

The Expert Panel on Clinical Guidelines for the Treatment of Obesity, three key meta analyses, were used to identify randomized trials related to the above mentioned topics (Franz et al 2007). Six of ten randomized studies found significantly greater weight loss in exercise alone versus no treatment controls. The extent of the effect averaged 1-2 kg. Only 2 of 13 studies found significant differences in initial weight loss for diet plus exercise versus diet only, although almost all studies pointed in this direction. Six studies were identified with maintenance periods of at least one year. In two of the six there were significant long-term differences favouring diet plus exercise, but in every study considered the direction of the difference favoured diet plus exercise. Other strong evidence showing benefits of exercise for long-term weight loss comes from co-relational analyses which consistently find that those individuals who report the greatest exercise have the best maintenance of weight loss. Randomized trials consistently show benefits of exercise for weight loss, but the effects are often modest. This may result from small sample sizes, short study duration, and poor adherence to the exercise prescriptions. To better define the doses and types of exercise that will promote long-term weight loss, it is necessary to develop better ways to measure exercise and promote adherence to exercise (ibid).

The focus in behavioural programmes is typically aerobic exercise, but Wadden and colleagues examined resistance training and the combination of resistance training and

aerobic exercise (1997; 1998). These investigators found no difference in weight losses achieved with the various types of exercise. Again selecting activities that patients enjoy and combining a variety of different types of exercise is recommended.

Data from the National Weight Control Registry, described above, highlights the importance of physical activity for weight loss maintenance (Klem et al 1997). In the NWCR, 91% of individuals report that physical activity was one aspect of their maintenance of weight loss. On average, women in the registry report expending 2545 kcal/week in exercise and men report 3293 kcal/week. These data suggest that successful weight losers exercise over an hour a day. The high exercise level reported by NWCR members has raised the question of whether participants in weight loss programmes should be encouraged to achieve higher activity levels, than typically recommended, e.g. 2500 kcal/week, rather than the usual 1000 kcal/week goal.

In another study, Jakicic et al (1999) reported better weight loss maintenance in patients who exercised > 200 minutes per week and (Jeffery et al 2001; Wing et al 1998) found that patients in the highest quartile of exercise, who expended over 2500 kcal/week, had better weight loss maintenance than those with lower levels of activity. A randomized controlled trial (Jeffery et al 2001) comparing 1000 kcal/week and 2500 kcal/week prescriptions was performed; at month 18, weight loss in the high exercise condition was significantly greater than the low exercise condition (6.7 kg vs. 4.1 kg). Thus, while the initial goal of behavioural programmes should be 1000 kcal/week (or 150 minutes/week), it was encouraged that patients progressed to higher goals over time (ibid).

Jeffery et al (1998) studied the use of personal trainers and financial incentives to increase exercise in a behavioural weight-loss programme. In this study, ninety-one healthy, overweight adult hospital employees aged 18 to 60 years with a body mass index of 25 to 36 kg/m^2 were examined. Analyses were performed for the 65 who had complete follow-up data. Participants were randomly assigned to a 6-month weight loss programme of either Internet education (education; N = 32 with complete data) or Internet behaviour therapy (behaviour therapy; N = 33 with complete data). All

participants were given one face-to-face group weight loss session and access to a Web site with organized links to Internet weight loss resources. Participants in the behaviour therapy group received additional behavioural procedures, including a sequence of 24 weekly behavioural lessons via e-mail, weekly online submission of self-monitoring diaries with individualized therapist feedback via e-mail, and an online bulletin board. Body weight and waist circumference, measured at 0, 3, and 6 months, compared the 2 intervention groups. Repeated-measures analyses showed that the behaviour therapy group lost more weight than the education group (P = 0.005). The behaviour therapy group lost a mean (SD) of 4.0 (2.8) kg by 3 months and 4.1 (4.5) kg by 6 months. Weight loss in the education group was 1.7 (2.7) kg at 3 months and 1.6 (3.3) kg by 6 months. More participants in the behaviour therapy than education group achieved the 5% weight loss goal (45% vs 22%; P = 0.05) by 6 months. Changes in waist circumference were also greater in the behaviour therapy group than in the education group at both 3 months (P =0.001) and 6 months (P = 0.005). Participants who were given a structured behavioural treatment programme with weekly contact and individualized feedback had better weight loss compared with those given links to educational Web sites (ibid).

Participants in behavioural programmes were instructed to record all activities they complete. To simplify recording, they are usually coached to center only on exercise sessions that last at least 10 minutes. Patients recorded either calories used in activity or minutes of activity. Modern civilization has evolved to a point where there are many devices designed to save energy expenditure, most notably automobiles, remote controls, and escalators. Patients in behavioural weight loss programmes were guided to identify these energy saving devices and to plan ways in which they can expend more energy in their daily activities, e.g. parking further from the store, using stairs, getting off the bus one stop earlier. Although these lifestyle behaviour changes added up over time to significant increases in energy expenditure, they are difficult to quantify and hard to record in self-monitoring diaries. Therefore such lifestyle activities were examined as a supplement to longer, more structured activity/exercise session. The number one barrier to exercise was lack of time. To address this problem, patients found it easier to exercise for multiple 10-minute sessions rather than one 40-minute session. In the study of Jakicic

et al (1995; 1999) 40 patients assigned to exercise in one 40-minute session/day, 5 days/week or to complete four 10-minute sessions on each of the 5 days. All other aspects of the weight loss programmes were identical in the two conditions. The short-session programme produced better initial adherence and comparable long-term changes in weight and cardiovascular fitness to the long-session programme. Thus, exercising in multiple sessions may be a useful option for some participants.

Epstein et al (1995) studied the effects of decreasing sedentary behaviours on activity choice in obese children. In this study, methods of decreasing highly preferred sedentary behaviours were compared and the consequent effects on activity choice were examined. Following free choice of sedentary and physical activities, 34 obese children either were positively reinforced for decreases in high-preference sedentary activity, were punished for high-preference sedentary activity, had access to high-preference sedentary activity restricted, or had no contingencies on activity (control group). Children randomized to reinforcement and punishment, were more physically active on intervention days than the control group. Liking for targeted sedentary activity decreased in the reinforcement group, but increased in the restriction and control groups. Results suggest that reinforcing decreases in high-preference sedentary activity can increase physical activity and decrease liking for targeted sedentary activities.

There have been studies performed on children that show that decreasing the number of hours/week of sedentary activities (TV, computer games) may be an effective approach to weight control (Epstein et al 1995; Robinson et al 1999). Epstein and colleagues (1995) compared the effects of increasing physical activity, decreasing sedentary behaviour, and the combination of the two in a study of overweight children aged 8-12. The children who were asked to decrease sedentary time had the best long-term weight control outcome and comparable improvements in fitness to the other conditions. These results suggest that as the children decreased sedentary activities they adopted other more physically active pursuits (and thus improved fitness). It is not known whether this approach would be as effective with adults as it was with children. Maintenance of physical activity is the key for long-term weight loss (Wing et al 1999; Pronk et al 1994),

but it is difficult to motivate patients to continue to be physically active long-term. Behavioural programmes teach patients strategies for dealing with common barriers to exercise, e.g. exercising in hot weather or cold weather; appropriate stretching exercises to prevent injuries. Motivation for physical activity is increased by encouraging patients to do a variety of different activities that they enjoy and helping patients recognize the improvements in fitness that occur with regular exercise.

Robinson et al (1999) have found an association between television viewing and child and adolescent adiposity. The objective was to assess the effects of reducing television, videotape, and video game use on changes in adiposity, physical activity, and dietary intake. Randomized controlled school-based trial conducted from September 1996 to April 1997. Two socio demographically and scholastically matched public elementary schools in San Jose, California of 198 third- and fourth-grade students who were given parental consent to participate, 192 students (mean age, 8.9 years) completed the study. Children in one elementary school received an 18-lesson, 6-month classroom curriculum to reduce television, videotape, and video game use. Changes in measures of height, weight, triceps skinfold thickness, waist and hip circumferences, and cardiorespiratory fitness; self-reported media use, physical activity, and dietary behaviours; and parental report of child and family behaviours. The primary outcome measure was body mass index, calculated as weight in kilograms divided by the square of height in meters. Compared with controls, children in the intervention group had statistically significant relative decreases in body mass index (intervention vs control change: 18.38 to 18.67 kg/m^2 vs 18.10 to 18.81 kg/m^2, respectively; adjusted difference -0.45 kg/m^2 [95% confidence interval {CI}, -0.73 to -0.17]; P=0.002), triceps skinfold thickness (intervention vs control change: 14.55 to 15.47 mm vs 13.97 to 16.46 mm, respectively; adjusted difference, -1.47 mm [95% CI, -2.41 to -0.54]; P=0.002), waist circumference (intervention vs control change: 60.48 to 63.57 cm vs 59.51 to 64.73 cm, respectively; adjusted difference, -2.30 cm [95% CI, -3.27 to -1.33]; P<0.001), and waist-to-hip ratio (intervention vs control change: 0.83 to 0.83 vs 0.82 to 0.84, respectively; adjusted difference, -0.02 [95% CI, -0.03 to -0.01]; P<0.001). Relative to controls, intervention group changes were accompanied by statistically significant decreases in children's

reported television viewing and meals eaten in front of the television. There were no statistically significant differences between groups for changes in high-fat food intake, moderate-to-vigorous physical activity, and cardio respiratory fitness. In conclusion reducing television, videotape, and video game use may be a promising, population-based approach to prevent childhood obesity.

The American College of Sports Medicine (ACSM) recommends specific guidelines for exercise-induced weight loss (Mahler 1995). The exercise programme should promote an expenditure of 300 to 500 kcal per session and 1,000 to 2,000 kcal per week for adults. However, this goal may not be realistic for the severely obese person. Thus, according to NHLBI (2000) guidelines, obese patients should start with moderate levels of physical activity (e.g., brisk walking) for 30 to 45 minutes, three to five days per week (an expenditure of a session 150 to 225 kcal per session), working up to exercise sessions on most, and preferably all, days of the week.

Exercise alone, without concomitant dietary therapy, produces minimal weight loss. The results from most studies have demonstrated that participating in regular endurance exercise activities (e.g. brisk walking for 45–60 min, 4 times weekly) for up to a year without an energy-restricted diet, usually results in minimal weight loss (an average 2-kg decrease in body weight compared with a control group) (Wing et al 1999) Moreover, it is not known whether weight loss was due to exercise alone or whether the participants also altered their dietary intake because they were enrolled in an exercise programme. In addition, these data may not represent the effect of exercise in obese persons because most subjects enrolled in these studies were slightly overweight men. Vigorous exercise training causes much greater losses in body weight when energy intake is held constant (Wing et al 1999)

Approximately 75% of weight that is lost by dieting is composed of fat and 25% is fat-free mass (FFM) (Ballor et al 1994). Adding a physical activity programme to dietary therapy can affect the composition of weight loss. Two meta-analyses that pooled data from 46 (ibid) and 28 (Garrow et al 1995) published trials found that exercise can

attenuate the loss of FFM. In subjects with a mean weight loss of 10 kg, regular exercise decreased the percentage of weight lost as FFM by half, from approximately 28% to 13% in men and from 24% to 11% in women ($P<0.05$). However, this large difference in percentage of weight lost as FFM represented only a small (approximately 1 kg) difference in the absolute amount of FFM lost between groups. Moreover, conservation of FFM does not necessarily represent conservation of muscle protein; the greater retention of FFM associated with exercise may be related to increased retention of body water and muscle glycogen. It is not known whether performing resistance exercise while dieting leads to greater conservation of FFM than performing endurance exercise because of limited and conflicting data (Wadden et al 1997; Geliebter et al 1997).

Physical activity recommendations

Over the last three decades, the American College of Sports Medicine (ACSM) has recommended physical activity and exercise guidelines. While these guidelines have changed dramatically over the years, and while other groups have offered alternatives, the ACSM recommendations still remain the core for physical activity programming.

In 1978, the ACSM recommended that individuals exercise three to five days a week for 15 to 60 minutes, with an overall goal of expending 300 kcal per activity session. The next update of these guidelines occurred in 1990. ACSM retained the aerobic component of its original guidelines but added a strength training recommendation and underscored the importance of realistic, personalized exercise programming. The most recent ACSM recommendations for physical activity were published in 2006 in conjunction with the Centers for Disease Control and Prevention (CDC). At this time, several modifications were made to existing components of the ACSM guidelines. The aerobic component was increased to a minimum of 30 minutes of moderate intensity physical activity on most days of the week. Additionally, ACSM recognized that physical activity has an additive effect, and suggested that three 10-minute sessions of physical activity could provide health benefits similar to that obtained with one 30-minute session.

The 2006 ACSM guidelines remained in use. However, these physical activity guidelines were not consistently agreed upon due to the introduction of recommendations from other

well-regarded scientific groups. For example, the Institute of Medicine (IOM) recommended 60 minutes of moderate intensity physical activity each day. In addition, the President's Council on Physical Fitness and Sports (PCPFS) recommended 20 minutes of vigorous activity at least three times per week, whereas the American Heart Association recommended 30-60 minutes of physical activity five to seven days per week. These competing recommendations have created a debate as to which guidelines should be adopted for public health initiatives.

Regardless of the recommendation to be used, the health benefits of regular physical activity are well established (Welk et al 2001). In 1996, The Surgeon General of the United States issued a report titled "*Physical Activity and Health*" that summarized the contemporary consensus regarding the health benefits of physical activity (U.S. Department of Health and Human Services 1996).

Significant health benefits can be obtained by including a moderate amount of physical activity (e.g., 30 minutes of brisk walking or raking leaves, 15 minutes of running, or 45 minutes of playing volleyball) on most, if not all, days of the week. Through a modest increase in daily activity, most people can improve their health and quality of life.

ANTHROPOMETRIC MEASUREMENTS

The term anthropometric refers to comparative measurements of the body. Anthropometric measurements are used in nutritional assessments. Those that are used to assess growth and development in infants, children, and adolescents include length, height, weight, weight-for-length, and head circumference (length is used in infants and toddlers, rather than height, because they are unable to stand). Individual measurements are usually compared to reference standards on a growth chart (Cogill 2001).

Anthropometric measurements used for adults usually include height, weight, body mass index (BMI), waist circumference, and percentage of body fat. These measures are then compared to reference standards to assess weight status and the risk for various diseases. Anthropometric measurements require precise measuring techniques to be valid (ibid).

Bioelectrical impedance analysis

Bioelectrical impedance analysis (BIA) is a commonly used method for estimating body composition. Since the advent of the first commercially available devices in the mid-1980s the method has become popular owing to its ease of use, portability of the equipment and it's relatively low cost compared to some of the other methods of body composition analysis. It is familiar in the consumer market as a simple instrument for estimating body fat (Kyle 2004). BIA actually determines the electrical impedance, or opposition to the flow of an electric current through body tissues which can then be used to calculate an estimate of total body water (TBW). TBW can be used to estimate fat-free body mass and, by difference with body weight, body fat.

Many of the early research studies showed that BIA was quite variable and it was not regarded by many as providing an accurate measure of body composition. In recent years technological improvements have made BIA a more reliable and therefore more acceptable way of measuring body composition. Nevertheless it is not a "gold standard" or reference method. Like all assessment tools, the result is only as good as the test done. Although the instruments are straightforward to use, careful attention to the method of use (as described by the manufacturer) should be given. Simple devices to estimate body fat, often using BIA, are available to consumers as body fat meters. These instruments are generally regarded as being less accurate than those used clinically or in nutritional and medical practice. In recent years, more accurate methods of Bioelectrical Impedance Analysis have been developed (ibid).

Waist circumference measurement and Body Mass Index

According to the National Institutes of Health, a high Waist Circumference (WC) is associated with an increased risk for type 2 diabetes, dyslipidemia, hypertension and cardiovascular disease when the Body Mass Index (BMI) is between 25 and 34.9. (A BMI greater than 25 is considered overweight and a BMI greater than 30 is considered obese). Waist Circumference can be useful for those people categorized as normal or

overweight in terms of BMI. (For example, an athlete with increased muscle mass may have a BMI greater than 25 - making him or her overweight on the BMI scale - but a Waist Circumference measurement would most likely indicate that he or she is, in fact, not overweight). Changes in Waist Circumference over time can indicate an increase or decrease in abdominal fat. Increased abdominal fat is associated with an increased risk of heart disease.

The WC is measured at the part of the trunk located midway between the lower costal margin (bottom of lower rib) and the iliac crest (top of pelvic bone) while the person is standing, with feet about 25-30 cm apart (10-12 in). The measurer should stand beside the individual and fit the tape snugly, without compressing any underlying soft tissues. The circumference should be measured to the nearest 0.5 cm (1/4 in), at the end of a normal expiration.

The waist circumference at which there is an increased relative risk is defined as follows. Waist circumference cut points lose their incremental predictive power in patients with a BMI ≥35 kg/m^2 because these patients will exceed the cut points noted below.

HIGH RISK
Men: >102 cm (>40 in.) Women: >88 cm (>35 in.)

A high waist circumference is associated with an increased risk for type 2 diabetes, dyslipidemia, hypertension, and CVD in patients with a BMI in a range between 25 and 34.9 kg/m^2 (Chan 1994). Monitoring changes in waist circumference over time may be helpful, in addition to measuring BMI, since it can provide an estimate of increased abdominal fat even in the absence of a change in BMI. Furthermore, in obese patients with metabolic complications, changes in waist circumference are useful predictors of changes in CVD risk factors (Lemieux 1996).

There are ethnic and age-related differences in body fat distribution that modify the predictive validity of waist circumference as a surrogate for abdominal fat (Gallagher 1996). These variations may partly explain differences between ethnic or age groups in the power of waist circumference or waist-to-hip (WHR) ratio to predict disease risks (Dowling 1993; Conway 1995).

In some populations, waist circumference is a better indicator of relative disease risk than is BMI: examples include Asian Americans or persons of Asian descent living elsewhere (Klatsky 1991; Fujimoto 1991). Waist circumference also assumes greater value for estimating risk for obesity-related disease at older ages. The table below (table 6) incorporates both BMI and waist circumference in the classification of overweight and obesity, and provides an indication of disease risk.

Table 6: Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risk*

			Disease Risk* Relative to Normal Weight and Waist Circumference	
	BMI (kg/m^2)	**Obesity Class**	**Men ≤ 102 cm (≤ 40 in.)**	**Men >102 cm (>40 in.)**
			Women ≤88 cm (≤ 35 in.)	**Women >88 cm (>35 in.)**
Underweight	18.5		-----	-----
Normal+	18.5 - 24.9		-----	-----
Overweight	25.0 - 29.9		Increased	High
Obesity	30.0 - 34.9	I	High	Very High
	35.0 - 39.9	II	Very High	Very High
Extreme Obesity	≥40	III	Extremely High	Extremely High

***** Disease risk for type 2 diabetes, hypertension, and CVD.
+Increased waist circumference can also be a marker for increased risk even in persons of normal weight.
Source: Adopted by NHANES 1988

THE RELATION BETWEEN DIET AND ACTIVITY CHANGES

Societies in which people eat less fat tend to have lower rates of obesity. A low-fat diet is, however, no guarantee of normal body weight (Knopp et al 1997). Sixty percent of the South African population is overweight, despite a comparatively low fat intake (about 22% of calories from fat) (Willett 1998). Foods with a high proportion of calories from fat should be eliminated from the diet or limited; these include red meat, dark poultry meat, poultry skins, fried foods, butter, margarine, cheese, milk (except skim milk), junk foods, and most processed foods. Vegetable oils, nuts, seeds, and avocados should be consumed in moderation, although these foods are healthy for people without weight problems. The diet should instead be based on fruit, vegetables, whole grains, and non-fat dairy products (with low-fat fish for non-vegetarians).

An older research indicated that people who successfully lost weight (Duncan et al 1983) got less of their total calories from fat and more of them from protein foods. They also ate fewer snacks of low nutritional quality and got more of their calories from “hot meals of good quality” (Anderson et al 2008).

Adequate amounts of dietary fibre are believed to be important for people wishing to lose weight. Fibre contains bulk and tends to produce a sense of fullness, helping people consume fewer calories (There is conflicting research on the effect of fibre intake on weight loss, however. Some trials have shown that supplementation with a source of fibre accelerated weight loss in people who were following a low-calorie diet (Marquette 1976). Other researchers (Hylander et al 1983) found, however, that increasing fibre intake had no effect on body weight, even though it resulted in a reduction in food intake. Different types of dietary fibre are available from a variety of sources, and the recommended amount depends on the type being used. People wishing to use a fibre supplement should consult a dietitian.

People who go on and off diets frequently complain that fewer calories result in weight gain with each weight fluctuation. Evidence now clearly demonstrates that the body gets “stingier” in its use of calories after each diet (Muls et al 1995). This means that the basal

metabolic rate lowers and it becomes easier to gain weight and harder to lose it the next time. Dietary changes need to be long-term.

Foods containing high amounts of carbohydrate are sometimes measured on a scale called the Glycemic Index (GI). The GI is a numerical value assigned to a particular food based on that food's ability to raise and sustain blood glucose levels, relative to the ability of a glucose beverage to do the same. Eating foods with a high GI (such as white rice, baked potato, corn flakes, white bread) promotes a more rapid return of hunger and increases subsequent intake of calories compared to eating similar foods with a lower GI (such as brown rice, all-bran cereal, oat bran bread) (Roberts 2001). Regular substitution of lower-GI foods, such as whole grains, for higher-GI refined foods may thus help prevent excess weight gain.

There were some lifestyle changes identified to be helpful such as the doctors giving overweight patients a pill, a pep talk, and a pamphlet about diet and exercise. However, that combination led only to minor weight loss (Wadden et al 2004). When overweight people attend group sessions aimed at changing eating and exercise patterns, keep daily records of food intake, and exercise and eat a specific low-calorie diet, the outcome is much more successful. Group sessions where participants are given information and help on how to make lifestyle changes appear to improve the chances of losing weight and keeping it off. Such changes may include shopping from a list, storing foods out of sight, keeping portion sizes under control, and avoiding fast-food restaurants.

Exercise has been found to enhance the effectiveness of low-calorie diets (Racette et al 1997). In addition, studies have shown that exercise alone (without dietary restriction) can promote weight loss in obese people (Chaston et al 2008). On the other hand, a review of numerous studies (Votruba et al 2000) found that the typical regimen of three to five hours per week of exercise generally had little effect on weight loss, and may, in the case of resistance exercise, even increase weight slightly. Exercise appears to have a more consistent ability to enhance loss of fat tissue, specifically, as well as to preserve non-fat tissue in the body (particularly resistance training, such as weight-lifting). The

same source suggested that the most significant contribution by exercise may be in helping to maintain weight loss following a diet (ibid).

People who experience "weight cycling" (repetitive weight loss and gain, or the yo-yo effect) have a tendency toward binge eating (periods of compulsive overeating, but without the self-induced vomiting seen in bulimia), according to a review of numerous studies focusing on weight loss (National Task Force 2000). The researchers also found an association between weight cycling and depression or poor body image. The most successful weight-loss programmes (in which weight stays off, mood stays even, and no binge eating occurs), appear to use a combination of moderate caloric restriction, moderate exercise, and behaviour modification, including examination and adjustment of eating habits.

USEFUL TOOLS FOR BEHAVIOURAL MODIFICATION AND WEIGHT MANAGEMENT

Questionnaire and Interview

Asking questions can provide measurement of many concepts and variables important to transportation research. Transportation practitioners ask questions frequently as part of assessment and evaluation. The important thing to remember when choosing this method is that it must be the most appropriate one to measure the variables as you have defined them (Wadden 2000).

The major difference between questionnaires and interviews is the presence of an interviewer (Wood et al 2010). In questionnaires, responses are limited to answers to predetermine questions. In interviews, since the interviewer is present with the subject, there is an opportunity to collect nonverbal data as well and to clarify the meaning of questions if the subjects do not understand.

The written questionnaire has some advantages. For one thing, it is likely to be less expensive, particularly in terms of the time spent collecting the data. Questionnaires can

be given to large numbers of people simultaneously; they can also be sent by mail. Therefore, it is possible to cover wide geographic areas and to question large number of people relatively inexpensively. Another advantage of questionnaires is that subjects are more likely to feel that they can remain anonymous and thus may be more likely to express controversial opinions. This is more difficult in an interview, where the opinion must be given directly to the interviewer. Also, the written question is standard from one subject to the next and is not susceptible to changes in emphasis as can be the case in oral questioning. There is always the possibility, however, that the written question will be interpreted differently by different readers, which is one reason for carefully pre-testing questionnaires.

Interviews have many advantages, the most significant of which is questioning people who cannot write their responses. This category also includes illiterate subjects or subjects who do not write as frequently as they speak. Oral responses from these individuals will contain much more information than would their written responses. Another advantage of the interview method is that it actually results in a higher response rate than does the questionnaire. Many people who would ignore a questionnaire are willing to talk, with an interviewer who is obviously interested in what they have to say. Another advantage of the interview technique is that you can plan to ask questions at several levels to get the most information from the subject. This approach is unique to the interview. The combination of structured and unstructured questions can provide depth and richness to the data and, at the same time elicit data that are comparable from one subject to the next.

When looking for a questionnaire or interview schedule to use in your study or when developing your own tool, you will have to consider the various kinds of questions that you can ask to obtain a range of data, and then decide which method is best suited to your variables. The content of the questions must be considered first, then the amount of structure in the format.

Question content or the purpose of the question falls into two basic categories: those aimed at facts and those aimed at perceptions or feelings. Factual questions ask subjects

for information about themselves or even regarding people who they know something about.

Nonfactual questions deal with the subjects' perception of what happened or their feelings about people, events, or things. They may also deal with the subjects' reasons for their behaviour. In these kinds of questions, you are not interested in whether the subject's report is accurate but rather in the subject's perception, which may or may not accurately reflect the facts.

The format of interviews and questionnaires, as that of observational methods, can range from very structured to very unstructured, depending on how much is known about the range of possible responses. Table 7 shows the criteria for choosing the Interview or Questionnaire (Keel 2002).

Table 7 Criteria for Selecting the Interview or Questionnaire

Advantages of the Interview	**Advantages of the Questionnaire**
The subject does not need to be able to read or write	This approach is less expensive in terms of time and money
The interviewer can observe the responses of the subject	Subjects feel a greater sense of anonymity
Questions may be clarified if they are misunderstood	The format is standard for all subjects and is not dependent on mood of interviewer
An-depth data may be obtained on any subject and are not dependent on predetermined questions	Large samples, covering large geographic areas, compensate for the expected loss of subjects
There is a higher response and retention rate	A greater amount of data over a broad range of topics may be collected

Source: Keel 2002

A combination of questionnaire and interview as for the purposes of the project the subject's self-report is essential and in order to get all possible provided information.

Checklist

Structured observation can take one of several forms, but perhaps the most common is the checklist. A checklist allows the researcher to record whether or not a given behaviour occurs. The desired behaviours must be explicitly defined so that there is no question in the mind of the observer as to whether or not they occur.

Structured observation, when appropriate, is an excellent method of collecting data. Many more subjects can be observed, in less time, than with unstructured observation, and the data analysis is much simpler. Taking results from a checklist merely involves counting how many times a particular behaviour occurred. The results of unstructured observation, on the other hand, consist of quantities of descriptive data, since the observer was trying to record everything that happened. These data must be sorted out to see if there are any patterns in the observed behaviour, and this is a very time consuming process (von Elm et al 2008).

Food and exercise record/diary

Self-monitoring is the core of all behavioural programmes and consists of self-observation and self-recording of those observations. Therefore, the subjects participating at the project will be required to keep both food and activity diaries. The situational factors, behaviours, thoughts, and feelings that occur before, during, and after attempts at prudent eating and exercise behaviours are recorded. Self-monitoring may prevent inappropriate behaviour because the patients know that their recorded indiscretions will be scrutinized by a therapist or peer (Foreyt 2000). Early studies found that patients spontaneously reduced calorie intake when daily diet records were kept. Patients who monitored their caloric intake and expenditure lost more weight than did those who did not use self-monitoring (Perri et al 2000). Several studies have found good correlations between self-monitoring and weight loss (Perri et al 1997; Gonder 2006) and

maintenance (Wing et al 2001), although self-monitoring and success could both be caused by a third motivational factor (Foreyt 2000).

Nutritional Counselling

Nutrition Counselling is an ongoing process in which a health professional, usually a registered dietitian, works with an individual to assess his or her usual dietary intake and identify areas where change is needed. The nutrition counselor provides information, educational materials, support, and follow-up to help the individual make and maintain the needed dietary changes (ADA 2000).

The goal of nutrition counseling is to help a person make and maintain dietary changes. For a person with a mental disorder, dietary change may be needed to promote healthier eating, to adopt a therapeutic diet, or to avoid nutrient-drug interactions. Nutrition counseling is an integral part of treatment for persons with eating disorders or chemical dependencies. Persons taking certain drugs, such as monoamine oxidase inhibitors, used to treat depression and anxiety disorders, need to follow a tyramine-controlled diet to avoid dietary interference with their medication. Many drugs used to treat mental disorders can cause weight gain or loss, so persons taking these medications may also benefit from nutrition counseling (Hammond 2000).

The nutrition counselor and the individual work together to assess current eating patterns and identify areas where change is needed. Registered dietitians have met certain education and experience standards and are well qualified to provide nutrition counseling, but nurses, physicians, and health educators also provide nutrition counseling (ADA 2000).

Assessing dietary habits

Nutrition counseling usually begins with an interview in which the counselor asks questions about a person's typical food intake. Nutrition counselors use different methods to assess typical food intake (Mitchell 1997).

The 24-hour recall method is a listing of all the foods and beverages a person consumed within the previous 24-hour period. The nutrition counselor may ask a person to recall the first thing he or she ate or drank the previous morning. The counselor then records the estimated amounts of all the foods and beverages the person consumed the rest of the day. The 24-hour food recall can be used to provide an estimate of energy and nutrient intake. However, people tend to over- or underestimate intake of certain foods, and food intake on one day may not accurately represent typical food intake (Mitchell 1997).

A food frequency questionnaire can sometimes provide a more accurate picture of a person's typical eating patterns. The nutrition counselor may ask the client how often he or she consumes certain food groups. For example, the counselor may ask a person how many servings of dairy products, fruit, vegetables, grains and cereals, meats, or fats he or she consumes in a typical day, week, or month (ibid).

Daily food records are also useful in assessing food intake. An individual keeps a written record of the amounts of all foods and beverages consumed over a given period of time. The nutrition counselor can then use the food records to analyze actual energy and nutrient intake. Three-day food records kept over two weekdays and one weekend day are often used (ibid).

Assessing body weight

Nutrition counselors may assess an individual's body weight by comparing his or her weight to various weight-for-height tables. Based to the American's weighting system which is accepted internationally, a rough rule of thumb for determining a woman's ideal body weight is to allow 100 lb (45 kg) for the first 5 ft (1.5 m) of height plus 5 lb (2.3 kg) for every additional inch. A man is allowed 106 lb (48 kg) for the first 5 ft (1.5 m) of height plus 6 lb (2.7 kg) for every additional inch. However, this guide does not take into account a person's frame size (Scarlet 1998). Body mass index, or BMI, is another indicator used to assess body weight which it was fully explained previously in this chapter.

Identifying changes needed

The initial dietary assessment and interview provide the basis for identifying behaviours that need to be changed. Sometimes a person already has a good idea of what dietary changes are needed, but may require help making the changes. Other times the nutrition counselor can help educate a person on the health effects of different dietary choices. The nutrition counselor and client work together to identify areas where change is needed, prioritize changes, and problem-solve as to how to make the changes (ibid).

Making dietary change is a gradual process. An individual may start with one or two easier dietary changes the first few weeks and gradually make additional or more difficult changes over several weeks or months. For example, an easy change for a person might be switching from 2% to skim milk, or taking time for a quick yogurt or granola bar in the morning instead of skipping breakfast. More difficult changes might be learning to replace high-fat meat choices with leaner ones, or including more servings of vegetables daily.

In making dietary changes, each individual's situation and background must be carefully considered. Factors that affect food decisions include an individual's ethnic background, religion, group affiliation, socioeconomic status, and world view (ibid).

Identifying barriers to change

Once the needed changes have been identified, the client and nutrition counselor think through potential problems that may arise. For example, changing eating behaviours may mean involving others, purchasing different foods, planning ahead for social events, or bringing special foods to work (Harris-Davis 2000). Some common barriers to changing eating habits include:

- inconvenience
- social gatherings
- food preferences
- lack of knowledge or time
- cost

Setting goals

The nutrition counselor and client set behaviour-oriented goals together. Goals should focus on the behaviours needed to achieve the desired dietary change, not on an absolute value, such as achieving a certain body weight. For a person working to prevent weight gain associated with certain medications, for example, his or her goals might be to increase the amount of fruit, vegetables, and whole grains consumed each day. Such changes would help prevent weight gain while placing the emphasis on needed behaviours rather than on actual weight (Harris-Davis 2000).

Finding support

Family members are encouraged to attend nutrition counseling sessions with the client, especially if they share responsibility for food selection and preparation. Although the individual must make food choices and take responsibility for dietary changes, having the support and understanding of family and friends makes success more likely (ibid).

Maintaining changes

The challenge for the nutrition client lies not in making the initial dietary changes, but in maintaining them over the long term. Self-monitoring, realistic expectations, and continued follow-up can help a person maintain dietary changes (ibid).

Self-monitoring involves regularly checking eating habits against desired goals and keeping track of eating behaviours. Keeping a food diary on a daily or periodic basis helps the individual be more aware of his or her eating behaviours and provides a ready tool to analyze eating habits. Sometimes a simplified checklist to assure adequate intake of different food groups may be used (Hammond 2000).

The Dietary Reference Intake (DRI) (Otten 2006) is a system of nutrition recommendations from the Institute of Medicine (IOM) of the U.S. National Academy of Sciences. The DRI system is used by United States, Canada and Europe and is intended for the general public and health professionals. Applications include:

Composition of diets for schools, prisons, hospitals or nursing homes, industries developing new food stuffs Healthcare policy makers and public health officials
The DRI was introduced in 1997 in order to broaden the existing guidelines known as Recommended Dietary Allowances (RDAs). The DRI values are not currently used in nutrition labeling, where the older Reference Daily Intake are still used (ibid).

Individuals and nutrition counselors should not expect perfect dietary compliance—slips inevitably occur. The goal is to keep small slips, such as eating a few extra cookies, from becoming big slips, like total abandonment of dietary change. The counselor can help the client identify situations that may lead to relapse and plan ways to handle the situations ahead of time (Hammond 2000).

Nutrition counseling is an ongoing process that can take months or years. In follow-up nutrition counseling sessions, the individual and counselor analyze food records together and problem-solve behaviours that are especially difficult to change. Follow-up counseling also allows the opportunity to reevaluate goals and strategies for achieving those goals (ibid).

Common Methods for Dietary Data Collection

The most valid, or accurate, dietary methods are prospective methods (Drewnowski 2001). These involve keeping records of foods consumed over the period of time of interest. This can be done by individuals themselves, or by others observing them. Sometimes the food is weighed before eating and then plate waste is weighed and subtracted. A similar method is to prepare two duplicate meals; one is consumed by the subject and the other is analyzed for nutrient content. Another method is the dietary record, in which the subject records estimated amounts of food consumed. In any case, these methods are highly reactive because individuals may alter usual behaviour to make their diet more socially desirable or to simplify the process of record keeping.

Recall methods are the most widely used type of dietary data collection method. They are less reactive, but also less accurate than record methods. Twenty-four hour recalls, in which the previous day's intake is queried in detail (for instance, foods, amounts, preparation techniques, condiments) are easier for individuals to complete (Kuczmarski

2000). The data reported are converted from foods to nutrients with the use of food composition tables. Because a single day is not representative of usual intake, multiple twenty-four hour recalls are frequently used. These multiple recalls can be thought of as sampling from an individual's ongoing food behaviour. The number necessary to reliably measure diet depends on the nutrient of interest. Nutrients widely distributed in food (such as carbohydrates) require fewer days than nutrients not widely distributed (such as cholesterol). The number of recalls needed also depends on the nature of the diet. In societies where day-to-day and season-to-season food intake varies, more days are needed than where diets are more monotonous.

The semi quantitative food frequency is a recall method in which an individual summarizes the diet to produce a measure of usual intake. For a list of foods commonly eaten, the individual estimates how frequently the food has been eaten in the time period in question (often, one year) and in what amount. Food composition tables are then used to estimate the usual daily intake. This method combines low burden on the individual with low cost. It has been widely used and studied, as it is the foremost method used in nutritional epidemiology. Research has examined how best to formulate a list of foods, how to present the foods to the subject, and whether portion sizes should be included.

Because the act of estimating frequency of intake is assumed to be based on cognitive processes, research has examined how best to maximize reliability and validity of food frequency data by focusing on the cognitive tasks experienced in the course of completing a food frequency questionnaire. This includes questions such as whether a long list of individual foods should be presented (for example, skim milk, 2 percent milk, whole milk) or whether foods should be nested (for example, questions asession the presence or absence of milk in the diet separated from the variety of milk). The results of these analyses have been mixed but suggest that incorporation of formatting changes based on cognitive theory will enhance the accuracy of reporting.

There has also been recent discussion of the actual task of summarizing and estimating intake experienced by the subject (ibid). The traditional explanation that persons completing a food frequency questionnaire actually retrieve and integrate past behaviour

to achieve an average dietary intake has been challenged by arguments that persons answer food frequency questionnaires in terms of a composite image of themselves and their diet, rather than a statistical estimate. If the latter is the case, one might expect that attempts to minimize error will reach a threshold of error that is unlikely to be crossed without a major conceptual shift in dietary data collection techniques for nutritional status assessment.

APPROACHES IN NUTRITION RESEARCH

The main goal of nutrition research is to identify most advantageous diets to promote health and prevent diseases. For this reason, during the past several decades, extensive research has been conducted concerning the relationship between diet and health. With advances in methodology and deeper insight, nutrition research looks more and more at details and, therefore, at more differentiated parts of diet as well as health.

The question arises whether the parts add up to the whole. In other words, does summing up detailed knowledge about individual constituents of diet replicate the overall effect of diet? For example, research on vegetarian diets may investigate the effect of single nutrients, especially those prone to deficiency (such as vitamin B-12) and the way they lead to a different perspective of vegetarian diets than investigating the effect of diet as a whole. Thus, findings of lower vitamin B-12 blood concentrations in vegetarians than in omnivores (Harman 1998) led to a more negative point of view than the more recent results documenting a lower mortality rate from ischemic heart disease as an effect of a vegetarian diet as a whole (Key 1998).

The traditional and dominating epistemological approach in nutrition research is reductionism. Epistemology is a branch of philosophy that studies the nature, origin, and limits of human knowledge. It addresses questions such as what knowledge is, how it is obtained, and what makes it knowledge. This is also the case for the relationship between diet and health. From the reductionist point of view, the objective of science is to reconstruct reality by its parts. The reductionist stance advocates an additive character of

linear cause-effect constructs, meaning that the whole can be explained by the sum of its parts (Mebratu 2001; Dent 2003).

Holism is an epistemological approach dealing with complexity and aiming to overcome the limitations of the mechanistic concept of nature. Instead of focusing on parts and linear cause-effect relationships, holism focuses on the whole and circular causalities. In the holistic concept, the whole is not viewed as the sum of its parts or something additional to the parts. It is rather considered as the dynamic interaction of the parts in their synthesis. This implies that a system as a whole has features not found in any one of the parts (Weinberg 1975).

For capturing diet as a whole—in addition to considering the holistic approach—several prerequisites need to be addressed. Knowledge asession parts is essential for an understanding of the whole. The reductionist approach has its place and is justified in the wider scope of holism (Mebratu 2001). This means that investigating the relationship between diet and health on the level of dietary constituents is necessary. However, nutrition research should also include research on foods and food groups (Willett 1998) and examination of dietary patterns or different dietary regimens, such as vegetarian diets. Because research on the level of diet automatically embraces the effect of all food components, foods, food groups, and their combinational effects, it will result in a more comprehensive and new understanding of the relationship between diet and health.

Triangulation

Triangulation, the application and combination of several research methodologies in the study of the same phenomenon, is a widely used method in the social and behavioural sciences (Denzin 1994; Pelto et al 1990). This framework is the preferred line in social sciences and behavioural modification. Weight management and behavioural modification are complex phenomena with different parameters involved. The study of such a complex human behaviour with diverse characteristics cannot be adequately explained and conceptualized using a single approach or methodological framework. The adoption of triangulation is thus significant in conceptualizing theoretically complex phenomena such as behaviour modification and weight management.

As Dreher and Hayes (1993) postulated, by using a combination of empirical as well as theoretical paradigms, the various components of a triangulated design inform each other and increase the capability to answer research questions. Consequently, confidence in findings is increased.

Specifically, for the purposes of this project, the following methodological and empirical paradigms were studied:

1. A thorough literature review to identify all relevant materials (behavioural modification in weight management), in educational press, academic journals, text covering policy in health and education, on-line journals, relevant dietetic, nutrition, educational websites and books.
2. Quantitative analysis of self-reported questionnaires.
3. Qualitative in depth personal interviews and focus group (in depth-understanding of behaviour and of the reasons that govern this kind of behaviour in nutrition and exercise).
4. Observational research (Systematic participant observation).
5. Design and implementation of a survey (including research design, research questions, hypotheses, sampling frame and methods, data collection, validity and reliability tests and data analysis).
6. Data Coding and input using.
7. Data analysis using *Statistical Package for Social Sciences* (SPSS).

Action Research

The proposed research utilized a participatory action research paradigm. Action research is about changing an environment, system, or practice, and learning about this context *through changing it*. To quote action research's instigator Kurt Lewin: "if you want truly to understand something, try to change it". This kind of work is not simply about changing, but also *improving* an environment. As John Elliott says, action research is “the

study of a social situation with a view to improving the quality of action within it" (1991).

A participatory action research is a significant methodology for intervention, development and change within organizations and groups. It refers to action research and intends to critically examine the current practice of an organization or programme (experienced as ineffective) in order to change and improve it. Action-research methodology aims at challenging traditional practice techniques and offering new and innovative ideas to deal with a problem. A participatory action research paradigm, involves individuals or groups (within an organization/programme and guides them to critically examine and reflect on the historical, political, cultural, economic and other contexts of a phenomenon (Wadsworth 1998). This critical study of a phenomenon, results in changes within the organization, its functioning and its decision making process.

Action research is intended to improve a real life problem situation by:

- Identifying and clarifying the problem
- Implementing the change intended to improve the situation
- Evaluating the situation to determine the impact of change

According to (Blaxter et al 2001), action research is educative, problem focused and involves a change intervention. The aim of action research is improvement and involvement since it deals with individuals as members of social groups. Those involved in the research process are also participants of change.

Empirical Research

Empirical research bases its findings on direct or indirect observation as its test of reality. Empirical Research is research that is based on experimentation or observation, i.e. Evidence. Such research is often conducted to answer a specific question or to test a hypothesis (educated guess).

Accurate analysis of data using standardized statistical methods in scientific studies is critical to determining the validity of empirical research. Statistical formulas such as regression, uncertainty coefficient, t-test, chi square, and various types of ANOVA (analyses of variance) are fundamental to forming logical, valid conclusions. If empirical data reach significance under the appropriate statistical formula, the research hypothesis is supported. If not, the null hypothesis is supported (or, more correctly, not rejected), meaning no significant effect of the independent variable(s) was observed on the dependent variable(s).

It is important to understand that the outcome of empirical research using statistical hypothesis testing is never proof. It can only *support* a hypothesis, *reject* it, or do neither. These methods yield only probabilities.

Among scientific researchers, empirical *evidence* (as distinct from empirical *research*) refers to objective evidence that appears the same regardless of the observer. For example, a thermometer will not display different temperatures for each individual who observes it. Temperature, as measured by an accurate, well calibrated thermometer, is empirical evidence. By contrast, non-empirical evidence is subjective, depending on the observer. Following the previous example, observer A might truthfully report that a room is warm, while observer B might truthfully report that the same room is cool, though both observe the same reading on the thermometer. The use of empirical evidence negates this effect of personal (i.e., subjective) experience.

Ideally, empirical research yields empirical evidence, which can then be analyzed for statistical significance or reported in its raw form. The empirical cycle consists of (Gobet, 1996):
Observation: The collecting and organisation of empirical facts; Forming hypotheses.
Induction: Formulating hypotheses.
Deduction: Deducting consequences of hypotheses as testable predictions.
Testing: Testing the hypotheses with new empirical material.
Evaluation: Evaluating the outcome of testing.

Observational- Longitudinal study

In statistics, the goal of an observational study is to draw inferences about the possible effect of a treatment on subjects, where the assignment of subjects into an intervention group versus a control group is outside the control of the investigator. This is in contrast with controlled experiments, such as randomized controlled trials, where each subject is randomly assigned to an intervention group or a control group before the start of the treatment. Observational method varies greatly in terms of the amount of structure provided for the observer. The structured method provides a complete list of expected behaviours and requires only that the observer check which ones occurred (Rosenbaum, 1997).

A major challenge in conducting observational studies is to draw inferences that are acceptably free from influences by overt biases, as well as to assess the influence of potential hidden biases. In observational studies, investigators may use propensity score matching (PSM-see glossary) in order to reduce overt biases. Furthermore, it should be realised that complete recording of an event is virtually impossible. Even with videotaping, exact replication will not be obtained because of biases. As soon as you begin your observations they will be given structure by your editing process (Von Elm et al 2008).

Structured observation can take one of several forms, but perhaps the most common is the checklist. A checklist allows the researcher to record whether or not a given behaviour occurs. The desired behaviours must be explicitly defined so that there is no question in the mind of the observer as to whether or not they occur.

Structured observation, when appropriate, is an excellent method of collecting data. Many more subjects can be observed, in less time, than with unstructured observation, and the data analysis is much simpler. Taking results from a checklist merely involves counting how many times a particular behaviour occurred. The results of unstructured observation, on the other hand, consist of quantities of descriptive data, since the observer was trying to record everything that happened. These data must be

sorted out to see if there are any patterns to the observed behaviour-a very time consuming process (ibid).

A longitudinal study is a correlation research study that involves repeated observations of the same items over long periods of time. Because longitudinal studies are observational, in the sense that they observe the state of the world without manipulating it, it has been argued that they may have less power to detect causal relationships than do experiments. But because of the repeated observation at the individual level, they have more power than cross-sectional observational studies, by virtue of being able to exclude time-invariant unobserved individual differences, and by virtue of observing the temporal.

The type of longitudinal study to use for this joint project is panel study as a sample will be chosen and it will be surveyed at regular intervals.

Quantitative and Qualitative Methods

The reason for using both quantitative and qualitative methods is to complement each other based on their strengths, weaknesses and their differing approaches. In most cases, researchers fall into one of the two categories-either relying exclusively upon "objective" survey questionnaires and statistical analyses and avoiding qualitative methods, or using only qualitative methodologies, rejecting the quantitative approach as decontextualizing human behaviour (Monsen 2003). Quantitative research uses methods adopted from the physical sciences that are designed to ensure objectivity, generalisation and reliability. These techniques cover the ways research participants are selected randomly from the study population in an unbiased manner, the standardised questionnaire or intervention they receive and the statistical methods used to test prearranged hypotheses regarding the relationships between specific variables. The researcher is considered external to the actual research, and results are expected to be replicable no matter who conducts the research. The strengths of the quantitative paradigm are that its methods produce quantifiable, reliable data that usually sample some larger population. Quantitative measures are often most appropriate for conducting needs assessments or for evaluations comparing outcomes with baseline data. This paradigm breaks down when the phenomenon under study is difficult to measure or quantify, something that does not

apply for this study. The greatest weakness of the quantitative approach is that it decontextualizes human behaviour in a way that removes the event from its real world setting and ignores the effects of variables that have not been included in the model. My proposed study has overcome this weakness by writing a very analytical questionnaire and complementing it with a more systematic protocol in order to have an overall prospective of the issue under investigation which in this case is the behavioural modification for weight management.

Qualitative research methodologies are designed to provide the researcher with the perspective of target audience members through immersion in a culture or situation and direct interaction with the people under study. Hypotheses are generated during data collection and analysis, and measurement tends to be subjective. In the qualitative paradigm, the researcher becomes the instrument of data collection, and results may vary greatly depending upon who conducts the research.

The advantage of using qualitative methods is that they generate rich, detailed data that leave the participants' perspectives intact and provide a context for health behaviour. The focus upon processes and "reasons why" differs from that of quantitative research, which addresses correlations between variables. A disadvantage is that data collection and analysis may be labour intensive and time-consuming (ibid).

CONCLUSION/ REFLECTION

Obesity is a chronic disease with no known cure. It requires long-term management similar to that of diabetes and hypertension. The use of long-term management strategies for chronic diseases is not perceived as treatment failure. Nor is treatment considered ineffective when a patient has difficulty adhering to the interventions. Rather, through the extensive study of the literature we acknowledge that many health care problems require long-term management and a focus on improving adherence to treatment. Obesity is best thought of and treated as a chronic disease requiring continuous care. Given this chronic disease model of obesity, treatment should no longer require large weight losses. Modest, sustained weight losses (5 to 10 percent of initial body weight) have been shown to positively modify many co-morbid disease risk factors (NHLBI 2000). Patients and physicians should focus on making lifestyle changes in small steps that lead to moderate and lasting weight losses. Because of the inherent difficulties in treating obesity, physicians/dietitians should also attempt to develop continuous care programmes emphasizing lifestyle modifications, such as enduring changes in dietary and activity habits. Patients using behaviour modification strategies to make these changes are more likely to succeed in long-term weight maintenance.

Furthermore obesity is the result of long-term positive energy balance. The mechanisms responsible for this energy imbalance are complex and variable, involving genetic, metabolic, cultural, environmental, and psychosocial factors. Obesity causes impaired function and disease in many organ systems, which often can be reversed or prevented by modest weight loss. Appropriate obesity therapy involves many of the same principles used in the management of other chronic diseases and requires continued support from physicians, dietitians and other caregivers as part of a long-term treatment plan. An effective weight loss programme combines diet therapy, physical activity, and behaviour therapy. Furthermore, certain patients may benefit from the addition of weight loss drugs to the basic treatment regimen. It is apparent that there is a need for further study of behaviour modification as far as eating behaviour is concerned and this project will be an insight in this specialized area of nutrition/dietetics for Cyprus.

Body composition is an integral component of total health and physical fitness. As health/fitness practitioners, we need to educate the general population about the desirable degree of fatness and how to attain it. By lessening obesity in our society, we will also have a positive impact on reducing the risk of a number of diseases including coronary heart disease, diabetes, hypertension and musculo-skeletal problems.

Body composition evaluation should be included as a fundamental aspect of all physical fitness appraisals. It is time we started promoting leanness, not thinness, to enhance lifetime physical and mental well-being for our clients. Understanding and being able to explain the difference between healthy leanness and undesirable thinness is one important concept dietitians and exercise experts must share with clients. In addition, there are some other reasons one should become more informed about body composition: to develop complete physical fitness profiles for clients, to monitor body fat loss and muscle growth resulting from exercise, to provide baseline data for nutritional counseling and treatment of obesity, to describe changes due to growth, to development, maturation, and aging and to maximize the performance of athletes.

Summary:

- Studies showed that diet alone, exercise alone, diet and exercise, or diets with appetite-suppressants usually result in minimal weight loss with rapid weight regain. When a behaviour modification component is combined with any of these weight loss strategies, the results are far better (Wadden et al 2000).
- The term “behaviour modification” might be a complementary term, since successful weight loss behaviour modification aims at reducing caloric intake, increasing physical activity and expanding your nutrition knowledge and food choices indefinitely.
- The average length of treatment is 36 weeks, (18 weeks for weight loss and 18 weeks for maintenance).
- Although some patients can accomplish this independently, most cannot. The latter are the individuals who will benefit from such a behaviour modification programme.

- Compliance with behaviour and lifestyle changes needed to lose weight and maintain weight loss can be extremely difficult because of genetic background; environmental pressures; and ingrained life-long behaviours.
- Studies showed that only 5-10% of the people who lost weight managed to maintain it (Wadden et al 2004).
- Failure rate based on gender- Female:44%, Male: 29%
- Eating Disorders- Disordered eating behaviours (binge eating and/or extreme weight control) (Martin 2007).
- Environmental Pressure

1. Weight-teasing by family, personal weight concerns, and dieting/unhealthy weight-control behaviours strongly and consistently predicted overweight status, binge eating, and extreme weight-control behaviours
2. Family meals, regular meal patterns, types and frequency of activity and media exposure to misleading messages about weight loss
   - According to WHO (1991)- 19% obese Cypriot Male and 24% obese Cypriot Female
   - According to Epidemiological study for the prevalence of diabetes (Loizou 2006) - 33.9% overweight Cypriot and 23.2% obese Cypriot
   - According to CyDA 1st Epidemiological study on obesity (2005 - 2009) indicated the percentage of Obese/Overweight people in the Cypriot population is 75.7% for men and 52.9% for women. The percentage of overweight people in Cyprus is 36% and the obesity is 27.8%.

The lifestyle management of obesity has been shown to be efficacious for successful weight loss and maintenance. Diet, physical activity, and behaviour modification are the key strategies used in lifestyle programmes. They are combined to help obese individuals achieve a gradual reduction in weight over an extended time period. The components may be combined in a variety of ways to effectively promote weight loss, allowing for flexibility and personal preference.

In reflection to the literature review this DProf project reviewed the evidence on the role of physical activity in the treatment of adult overweight and obesity. Three specific questions were addressed: (1) does exercise alone produce weight loss? (2) Does exercise in combination with diet produce greater weight loss than diet only? and (3) does exercise in combination with diet produce better maintenance of weight loss than diet alone?

CHAPTER 3

EPISTEMOLOGY, METHODS, METHODOLOGY

An Investigation into the Methodologies and Epistemologies used by the Practitioner Researcher

Research Design

This chapter presents the research design and procedures for the study ***"The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Lifestyle Changes for Adults in Cyprus".*** The procedures integrated the review of related literature, population and sample selection, instrumentation, instrument reliability and validity, data collection, and data analysis. For clarity and consistency in the thesis, the Publication 'Doctorate in Professional Studies' Handbook (Middlesex 2009/10) was utilized as a guideline for outline and manner.

There is not a definitive definition of methodology used in the applied and behavioural sciences which it can serve the purposes of all researchers. Different researchers offer slightly conflicting definition according to their own training, discipline and purposes. Consequently, Kaplan (1997) perceives the intend of methodology to be:

"…to describe and analyse … methods, throwing light on their limitation and resources, clarifying their suppositions and consequences, relating their potentialities to the twilight zone at the frontiers of knowledge. It is to venture generalizations for the success of particular techniques, suggesting new applications, and to unfold the specific bearings of logical and metaphysical principles on concrete problems, suggesting new formulations." (1997 pp.597-617)

Creswell (2003) stresses:

"…the analysis of the principles of methods, rules, and postulates employed by a discipline and the systematic study of methods that are, can be, or have been applied within a discipline." (2003 pp.1-246)

Methodology may be a description of process, or may be expanded to include a philosophically coherent collection of theories, concepts or ideas as they relate to a particular discipline or field of inquiry. Also, it may refer to a set of methods or procedures, or it may refer to the rationale and the philosophical assumptions that underlie a particular study relative to the scientific method (Patton 2002).

Scientific method refers to a body of techniques for investigating phenomena, acquiring new (Goldhaber et al 2010) knowledge, or correcting and integrating previous knowledge. To be termed scientific, a method of inquiry must be based on gathering observable, empirical and measurable evidence subject to specific principles of reasoning. A scientific method consists of the collection of data through observation and experimentation, and the formulation and testing of hypotheses (Newton 1999). The word empirical denotes information gained by means of observation, experience, or experiment (The American Heritage Dictionary of the English Language 2000).

A central concept in science and the scientific method is that all evidence must be empirical, or empirically based, that is, dependent on evidence or consequences that are observable by the senses. The term refers to the use of working hypotheses that are testable using observation or experiment. Empirical data is data that is produced by experiment or observation.

The standard positivist view of empirically acquired information has been that observation, experience, and experiment serve as neutral arbiters between competing theories. However, since the 1960s, Thomas Kuhn (1970) has promoted the concept that these methods are influenced by prior beliefs and experiences. Theory-dependence of observation means that, even if there were agreed methods of inference and interpretation, scientists may still disagree on the nature of empirical data (Bird 2005).

Traditionally, for philosophers the twin terms of methodology are *ontology* and *epistemology*, understood as the study of being and knowing respectively. Basically, ontology is a theory of what exists, and how it exists and an epistemology is a related theory of how we can come to know those things.

Epistemology is a branch of philosophy that studies the nature, origin, and limits of human knowledge. It addresses questions such as what knowledge is, how it is obtained, and what makes it knowledge (Hoffmann 2003).

The reductionist approach has usually been and continues today as the leading approach in nutrition and exercise research (ibid). This means that parts of diet and exercise rather than the whole, or single food components rather than food habits, are studied. Even though much progress has been made with this approach, the relationship between diet and health is not yet completely stated. The recognition of the whole being more than the sum of its parts, the limitations on the applicability of the reductionist approach, and the growing knowledge about parts of diet, another epistemological approach, such as holism, and new research strategies, such as transdisciplinarity, are needed to reveal more about the relationship between diet and health.

The main goal of nutrition research is to identify optimal diets and exercise guidelines related to nutrition to promote health and prevent diseases. For this reason, during the past several decades, extensive research has been conducted concerning the relationship between diet, exercise and health. With the progress to methodology and deeper insight, nutrition research looks more detailed and, therefore, at more differentiated parts of diet as well as health.

The query is if these parts add up to the whole. Therefore, outlining thorough knowledge about the different elements of diet does not always reveal the overall effect of diet. That is why research on vegetarian diets may instruct us a lesson about this: exploring the effect of single nutrients, especially those prone to deficiency (such as vitamin B-12), directed to a diverse perception of vegetarian diets than exploring the effect of diet as a whole. Thus, findings of lower vitamin B-12 blood concentrations in vegetarians than in omnivores (Harman et al 1998) directed to a more negative point of view than the more recent results documenting a lower mortality rate from ischemic heart disease as an effect of a vegetarian diet as a whole (Key 1998).

In reflection to the proposed study with the title ***"The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Lifestyle Changes for Adults in Cyprus",*** using the reductionist approach for weight loss, the summing up of low caloric diets do not always reveal the overall effect of weight loss to human health. For example, a diet of 1200 kcal daily can promote weight loss but also a decrease on the basal metabolism. However, the seven countries study (Keys 1984) showed that 10% weight loss for obese people can have beneficial effect to the overall health (e.g. decrease blood lipid profile, sugar levels, and systolic blood pressure) and especially heart disease, diabetes and circulatory problems.

The traditional and dominating epistemological approach in nutrition research is reductionism. This is also the case for the relationship between diet, exercise and health. From the reductionist point of view, the objective of science is to reconstruct reality by its parts. The reductionist point advocates an additive character of linear cause-effect constructs, meaning that the whole can be explained by the sum of its parts (Mebratu 2001; Dent 2003).

In this context, diet and exercise as a whole are referred to as the behaviour modification techniques, food selection or food pattern or activity level of a person or population. Diet generally consists of food groups, food items, and food constituents. Whereas, exercise consists of different activity types and intensity according to individual's physical level. Health as a whole in this context is viewed as physical health. This may be reduced to multiple systems, their components, and biological markers.

There are several reasons why dietary and health issues go beyond the reach of a reductionist epistemological foundation (Wu et al 2002). One reason is that diet and health feature complex system characteristics. These include being composed of a large number of components, not being completely reducible to its parts, and exhibiting nonlinear interactions between components, response delays, and feedback loops. The complexity of diet may be exemplified by its composition. Diet consists of a mixture of foods, and those foods are composed of a multitude of chemicals. As a result of this, there are combinational effects, such as interactions, antagonisms, and synergisms that explain a proportion of the whole not being encompassed by examining the parts (Messina et al 2001).

Out of the array of dietary components and the factors relevant for the relationship between diet and health, only a limited number are usually included in research models. Others not included in the models may also contribute to the relationship between diet and health. These additional components and factors may be known but not evaluated, or it may not be possible to evaluate them. Also, there may still be unknown components in the diet or unknown factors in the studied relationship. Thus, the understanding of the relationship between diet and health may partly be limited because there may be too many relevant components and factors to be considered; their assessment may be difficult; or their effects, although relevant, may be too small to be statistically significant.

Methodological aspects may also contribute to the gap between parts and the whole. As examples, inter- and intrapersonal variations of diet may be named. Traditional methodology usually applies to linear cause-effect relationships. In complex systems, such as diet or health, multicausal nonlinear relationships (Mebratu 2001) may exist in addition to linear cause-effect relationships.

Studying the parts with the reductionist approach allows the description of the interaction of a single nutrient with a single outcome and is essential for subsequently exploring the effect of the whole. However, just investigating the effect of parts or the combination of some parts may lead to formally accurate scientific assessments but still provide a very restricted and biased view of reality (Giampietro et al 2000). Consequently, the reductionist approach fails to adequately describe the multiplicity of metabolic effects on the entire organism (Desiere et al 2002).

As it appears, with the understanding that the whole is more than the sum of its parts, the recognition that the applicability of the reductionist approach is limited, and the emergence of knowledge about parts of diet, another epistemological approach, and new research strategies are required for researching diet and health as a whole.

Holism is an epistemological approach dealing with complexity and aiming to overcome the limitations of the mechanistic concept of nature. Instead of focusing on parts and linear cause-effect relationships, holism focuses on the whole and circular causalities. In the holistic concept, the whole is not viewed as the sum of its parts or something additional to the parts. It is rather

considered as the dynamic interaction of the parts in their synthesis. This implies that a system as a whole has features not found in any one of the parts (Weinberg 1975).

For capturing diet as a whole—in addition to considering the holistic approach—several prerequisites need to be addressed.

First, knowledge about parts is essential for an understanding of the whole. The reductionist approach has its place and is justified in the wider scope of holism (Mebratu 2001). This means that investigating the relationship between diet and health on the level of dietary constituents is necessary. However, nutrition research should also include research on foods and food groups (Willett 1998) and examination of dietary patterns or different dietary regimens, such as vegetarian diets. Because research on the level of diet automatically embraces the effect of all food components, foods, food groups, and their combinational effects, it will result in a more comprehensive and new understanding of the relationship between diet and health.

Second, to gather more detailed information and to assess many factors influencing the relationship between diet, exercise and health, sophisticated methodology is required. This applies to the study design, especially dietary assessments, and to statistical methods.

Third, there is a need for the development of more complex models that allow information combining and insight into the complexity of the whole with its interactions (e.g. modelling complex systems). The American Society for Nutritional Sciences encourages scientists in the field of nutrition to integrate the knowledge from molecular events to metabolism and further to behaviour (Zeisel 2001).

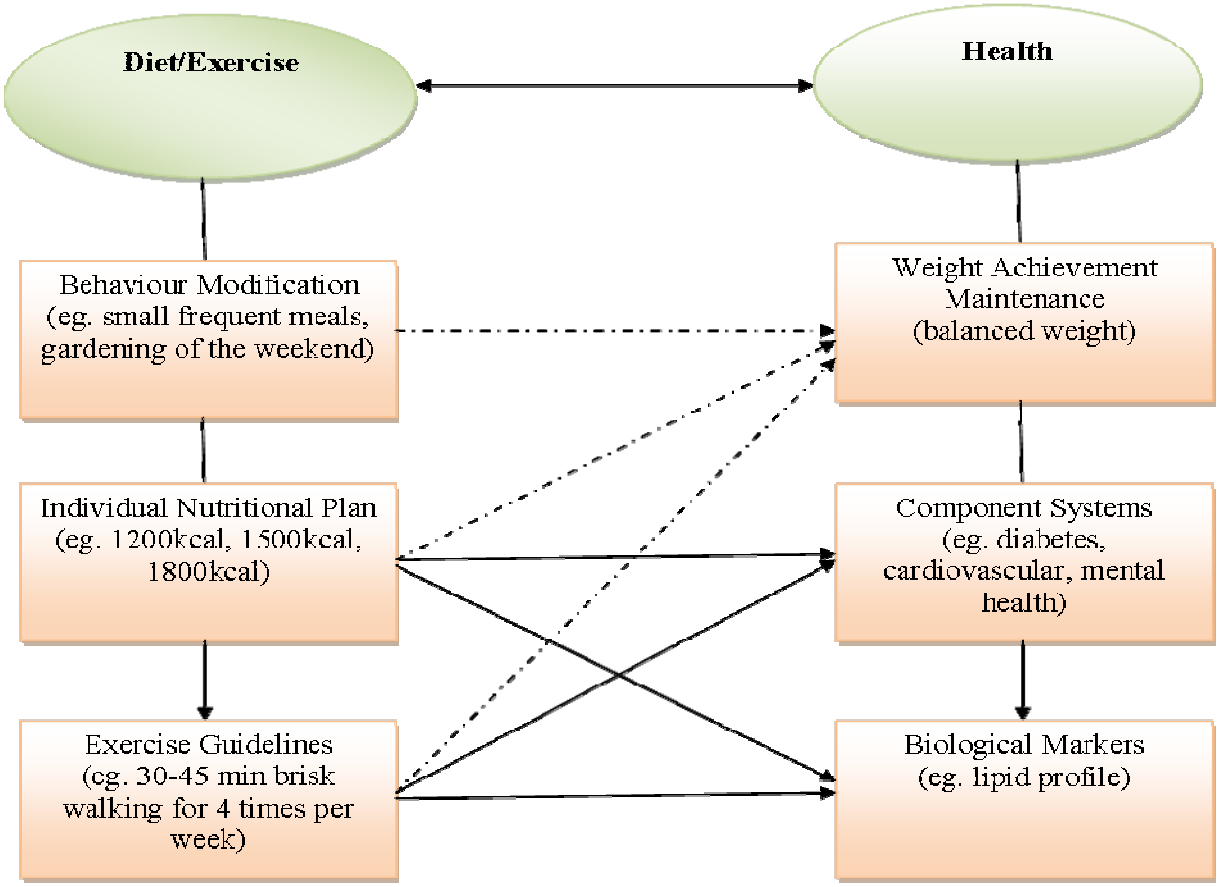
Fourth, massive computing power is essential to integrate detailed information about the parts, the influencing factors, and nonlinear relationships and to model complex systems.

Fifth, because nutrition combines several sciences, in this field multidisciplinary and interdisciplinary research strategies have frequently been applied. Multidisciplinarity is restricted to one or a variety of disciplines operating without the integration of concepts, while interdisciplinarity enables a collaboration of several disciplines exchanging concepts, methodology, and so on. Integrating the sciences of nutrition with holistic thinking makes it

possible to proceed to a transdisciplinary concept. For transdisciplinarity it is characteristic to transgress the boundaries between and beyond disciplines and institutions, such as between basic and applied research (Häberli 2001).

In reflection to this research project, the main components of the study and their interrelation are shown in the specifically designed for the research **figure 1** below:

Figure 1. The main components of the DProf and their interrelation



This represents the whole and the parts of diet and health. Starting from the top as whole, both diet/exercise and health may be reduced to parts (symbolized by the single rectangles and examples). The solid arrows indicate the usually studied relationships, and the dotted arrow indicates the relationship that will be studied in our joint proposed project.

In the past century, nutrition research has focused on individual dietary constituents and their relationship to specific biological markers. This means that nutrition research has been carried out with highest differentiation or reduction to the smallest event, while the final purpose of the proposed research is to contribute to the knowledge on optimal diet and exercise, which will be on the level of high integration or the whole. The past and ongoing research illustrates that the whole may not be obtained by solely investigating its parts and adding up this knowledge, but rather that the whole is more than the sum of the parts (Hoffman 2003).

In the current study, the individual constituents of diet – individual nutritional plan, physical activity, and behaviour modification and how they reflect to long term weight achievement and maintenance are investigated. Research on how to achieve and maintain healthy weight it can lead to the assumption that the investigation of a single factor for weight loss (i.e., weight loss nutritional plan) leads to a different perspective rather than investigating the effect of diet, physical activity and behaviour modification as a whole. The needs of the proposed study, necessitates the linear cause-effect relationships of individual parts shown in the diagram. For example, the relationship of the diet/exercise to their components (behaviour modification, nutrition plan, exercise guidelines) and the relationship of health to its components (weight achieving, component systems, biological markers). At the same time the key components of diet/exercise and health have a reciprocal and circular cause-effect relationship. Therefore, the approach to use for the purposes of the joint project is a combination of reductionist and holistic approach.

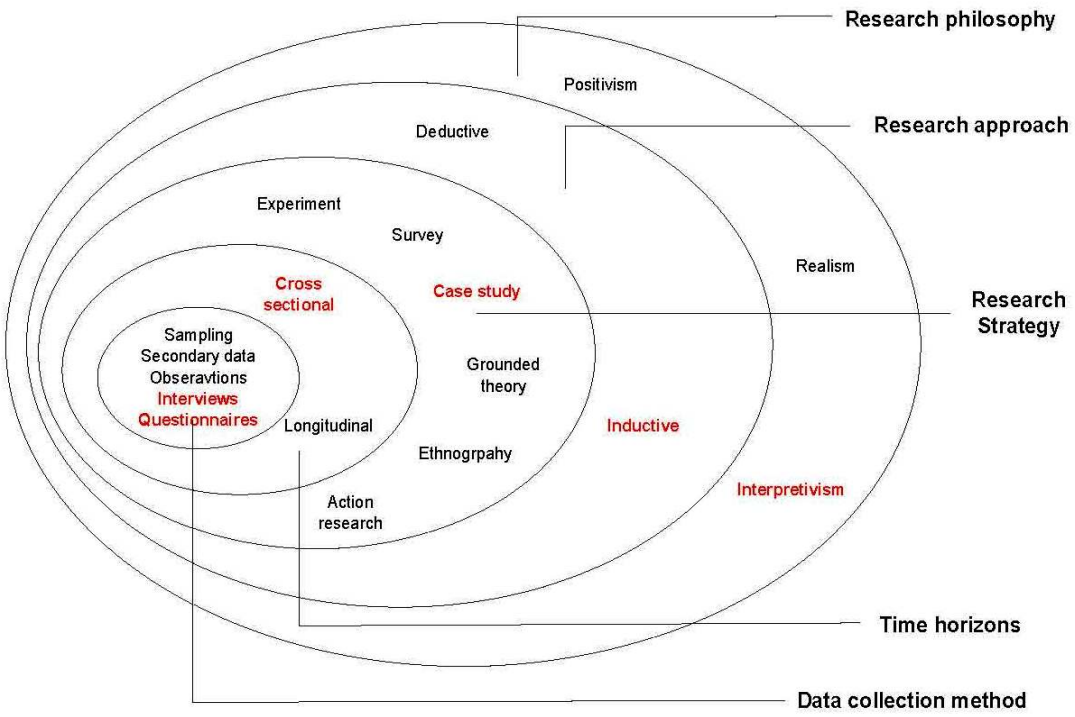
It is the task of methodology to uncover and justify research assumptions as far and as practicably as possible, and in so doing to locate the claims which the research makes within the

traditions of enquiry which use it. Equally, it is our task as researchers, to identify our research tools and our rationale for their selection.

Research Process

The researcher shall be utilizing the research process 'onion' in order to come up with the most appropriate research approaches and research strategies in identifying the impact of ***"The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Lifestyle Changes for Adults in Cyprus".*** Although it is not rare for a researcher to first consider whether one should, for instance, administer a questionnaire or conduct interviews, thoughts on this question accordingly belong to the centre of the research 'onion', in which, in order to come to the fundamental issue of how to collect the data needed to answer ones research questions, there are important layers of the onion that need to be peeled away: the first layer raises the question of the research philosophy to adopt, the second considers the subject of research approach that flows from the research philosophy, the third examines the research strategy most applicable, the fourth layer refers to the time horizon a researcher applies to his research, and the fifth layer is the data collection methods to be used (Saunders et al 2003).

Diagram 1. The Research Onion



Source: Saunders et al 2003

Diagram 1 shows how the researchers considered the research approach to be applied in the study presented in this document in order to crop up with the pertinent data needed to answer the research questions presented in the first chapter, as well as to fulfil the research objectives.

Research Philosophy and Paradigm

As approaches in the different layers have dependencies, it is suggested that a research design should be developed from the top down, starting with the outside layer [adopting a research philosophy] and thereafter peeling away each layer until the fifth layer is reached [defining data collection methods]. For the purposes of this study, this approach (Remenyi et al 1998) was used.

A *positivistic philosophy* aims at the derivation of laws or law-like generalizations similar to those in the physical and natural sciences (Remenyi et al 1998). Quantitative research allows researchers to familiarize themselves with the problem or concept to be studied. The emphasis is

on facts and causes of behaviour (Bogdan et al 1992), with the information in the form of numbers that can be quantified, and summarized using a mathematical process for analysing the numeric data and expressing the final result in statistical terminology (Charles 1995).

The *realistic philosophy* shares two features with a positivism philosophy: a belief that the natural and the social sciences should apply the same kinds of approach to the collection of data and to explanation, and a commitment to the view that there is an external reality to which scientist direct their attention (Bryman 2001).

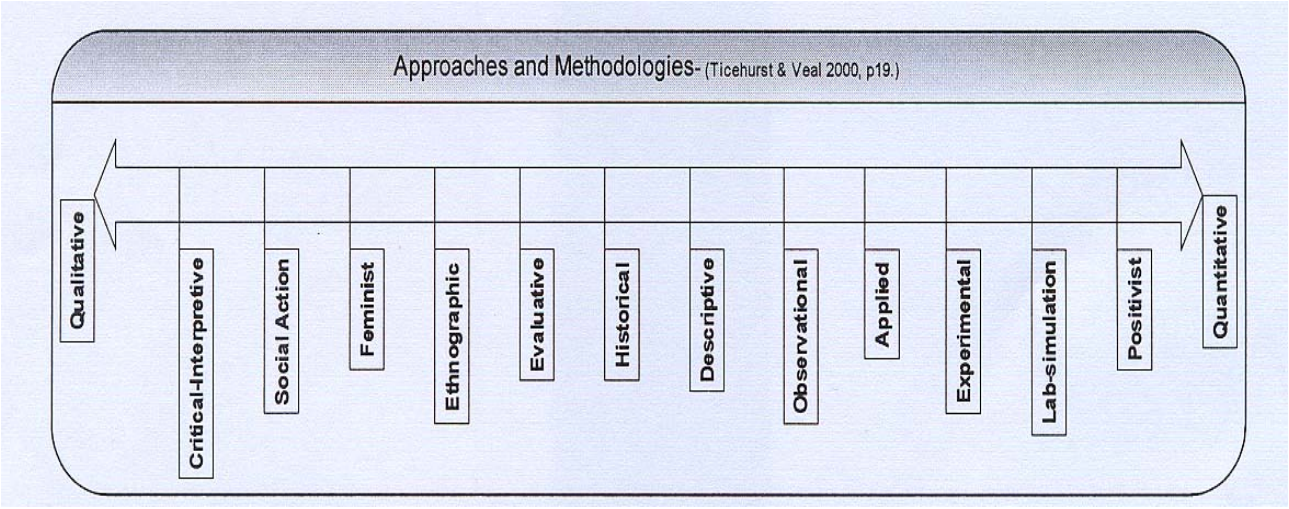
The *interpretivistic philosophy*, on the other hand, asserts that the assumptions of both philosophies are unwarranted; especially in cases where the objectives of study are influenced by many factors, extremely difficult to isolate and control in experimental laboratory settings (see for example Hirschheim and Klein 1995). Qualitative research, broadly defined, means any kind of research that produces findings not arrived at through quantification (Strauss et al 1990) and which arise from real-world settings (Patton 1990).

As shown in Figure 2, the research philosophy that is reflected in this study is positivism. With this research philosophy, a researcher prefers to work with an observable social reality in order to come up with law-like generalisations similar to those produced by the physical and natural scientists (Remenyi et al 1998), and in this tradition, the researcher becomes an objective analyst, steadily making detached interpretations about those data that have been collected in an apparently value-free manner (Saunders et al 2003). In this case, the researchers seeks to illustrate an objective analysis on the role of ***"The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Lifestyle Changes for Adults in Cyprus"***, using the research onion process. In addition, the emphasis is on a highly structured methodology to facilitate replication (Gill et al 1997) and on quantifiable observations that lend themselves to statistical analysis. (Saunders et al 2003) In here, the assumption is that the researcher is independent of and neither affects nor is affected by the subject of the research. (Remenyi et al 1998; Saunders et al 2003) Thus, the researchers are deemed to be objective in the analysis and in the conduct of the research.

In many cases research may be categorized as 'positivist'and it can be designed to reflect the goals of positivist thinking. That is, the world is measurable, controllable, and explainable. Easterby-Smith, Thorpe et al (2002) argue that the key idea of positivism *is that the world exists externally, and that its properties should be measured through objective methods*. This infers that only knowledge, which is observable, is in fact valid. This then brings together the epistemology of positivism with quantitative methods i.e. methods, which are essentially numerical evidence, following a very 'natural science' approach to the research in hand.

Ticehurst and Veal (2000) support this linkage between quantitative and positivism by stating that *the quantitative approach to research is also known as management science or operations research.* Therefore linking disciplines with philosophy. They then argue that quantitative and qualitative methods are linked to positivism and interpretivism epistemologies, as shown in their figure below:

Figure 2. Approaches and methodologies



Source: Ticehurst and Veal 2000

The placement of qualitative and quantitative methods as polar opposites is further reinforced by Ticehurst and Veal when they argue

"That there is considerable debate among scholars……about the relative merits and value of qualitative versus quantitative business research ……and that the debate is often aligned with differing philosophical positions." *(2000, pp 19)*

This in essence creates an almost mutually exclusive situation for students and researchers; whereby depending on whether one takes a positivistic or critical interpretivistic stance one will use either qualitative or quantitative methods. Closer inspection of **figure 2** (ibid) raises the issue of placement of other approaches and methodologies. For example, by placing feminists on the qualitative end of the scale are Ticehurst and Veal suggesting that there cannot be positivist feminist scholars. Again the placement of historical approaches suggests that econmetric historians do not exist; surprising given the work by Fogel and Engerman (1974) *Time on the Cross: the economics of American Negro slavery*; where quantitative methods were used to investigate a morally-laden topic, that of slavery.

This concept of polar opposites is further encouraged by Saunders et al (2003) who refer to the research process as an 'onion'. Within this 'onion' the second layer refers to *the subject of the research approach that flows from the research philosophy.* Therefore, linking the philosophy of positivism with different approaches, in this case deduction and similarly interpretivism with induction.

Therefore whether one's research should use a deductive approach, in which a theory and hypothesis (or hypotheses) were developed and a research strategy was designed to test the hypothesis; or the inductive approach, in which data would be collected and theory would be developed as a result of the data analysis is paramount. Again this gives the student a seemingly either or dilemma. It infers to the student or the researcher that the research approach of induction or deduction are in fact mutually exclusive; in the same way that positivism and interpretivism are placed at polar opposites (Saunders et al 2003).

Research paradigm

Paradigm comes from the Greek paradeiknyai - to show side by side – and is a pattern or example of something. The word connotes the ideas of a mental picture or pattern of thought (Shtarkshall 2004).

While Henning et al (2004), define a paradigm as "a theory or hypothesis", a paradigm is rather a framework within which theories are built, that fundamentally influences how the world is seen, determines the individual's perspective, and shapes the understanding of how things are connected. Holding a particular world view influences he personal behaviour, the professional practice, and ultimately the position is taken with regard to the subject of the research.

Classifying research paradigms

Guba and Lincoln (1994) state that the basic beliefs that define a particular research paradigm may be summarised by the responses given to three fundamental questions:

1. The ontological question i.e. what is the form and nature of reality
2. The epistemological question i.e. what is the basic belief about knowledge (i.e. what can be known)
3. The methodological question i.e. how can the researcher go about finding out whatever s/he believes can be known.

Below is an analysis of three major research paradigms as illustrated by Shtarkshall (2004) (**table 1):**

Table 1. Research paradigms

Questions for analyzing paradigms		Research paradigms		
		Positivism	**Interpretivism**	**Critical Theory**
Ontological Questions	Nature of reality	▪ An objective, true reality exists which is governed by unchangeable natural cause-effect laws ▪ Consists of stable pre-existing patterns or order that can be discovered ▪ Reality is not time- nor context-bound ▪ Reality can be generalised	▪ The world complex and dynamic and is constructed, interpreted and experienced by people in their interactions with each other and with wider social systems i.e. fluid definitions of a situation created by human interaction/social construction of reality ▪ Reality is subjective. People experience reality in different ways. Subjective reality is important i.e. what people think, feel, see) ▪ Reality can only be imperfectly grasped ▪ The use of language defines a particular reality	▪ Governed by conflicting, underlying structures – social, political, cultural, economic, ethnic, gender

	Nature of human beings	▪ Rational ▪ Shaped by external factors (same cause has the same effect on everyone) i.e. mechanical model / behaviourist approach. Under certain conditions people will probably engage in a specified behaviour	▪ Social beings who create meaning and who constantly make sense of their worlds ▪ People possess an internally experienced sense of reality	▪ People can design / reconstruct their own world through action and critical reflection

Source: Shtarkshall 2004

Table 1 cont. Research paradigms

Questions for analysing paradigms		Research paradigms		
		Positivism	**Interpretivism**	**Critical Theory**
Epistemological questions	Nature of knowledge	▪ Knowledge can be described in a systematic way ▪ Knowledge consists of verified hypotheses that can be regarded as facts or laws. ▪ Probabilistic – i.e. holds true for large groups of people or occurs in many situations ▪ Knowledge is accurate and certain	▪ Knowledge is based not only on observable phenomena, but also on subjective beliefs, values, reasons, and understandings ▪ Knowledge is constructed ▪ Knowledge is about the way in which people make meaning in their lives, not just that they make meaning, and what meaning they make.	▪ Knowledge is dispersed and distributed ▪ Knowledge is a source of power ▪ Knowledge is constituted by the lived experience and the social relations that structure these experiences ▪ Events are understood with social and economic contexts
	Role of theory	Theories are: ▪ Normative ▪ Present 'models' ▪ General propositions explaining causal relationships between variables	Theories: ▪ Are revisable ▪ Approximate truth ▪ Are sensitive to context	Theories: ▪ Are constructed in the act of critique in a dialectical process of deconstructing and reconstructing the world.

	Theory building/testing	▪ Postulate a theories that can be tested in order to confirm or reject ▪ Prove a theory from observable phenomena / behaviour ▪ Test theories in a controlled setting, empirically supporting or falsifying hypotheses through process of experimentation	▪ Theories are built / constructed from multiple realities – the researcher has to look at different things in order to understand a phenomenon ▪ Theory is shaped by social and cultural context	▪ Theories are built from deconstructing the world, from analysing power relationships
	Role of research	▪ Uncover reality i.e. natural laws ▪ Scientifically explain / describe, predict and control phenomena	▪ Study mental, social, cultural phenomena – in an endeavour to understand why people behave in a certain way. ▪ Grasp the 'meaning' of phenomena ▪ Describe multiple realities	▪ Promoting critical consciousness ▪ Breaking down institutional structures and arrangements that produce oppressive ideologies and social inequalities ▪ Shift the balance of power so that it may be more equitably distributed ▪ Address social issues ▪ Political emancipation and increasing critical consciousness

Source: Shtarkshall 2004

Table 1 cont. Research paradigms

Questions for analysing paradigms		Research paradigms		
		Positivism	**Interpretivism**	**Critical Theory**
Epistemological questions (cont)	Research findings are true if:	▪ Can be observed an measured ▪ Can be replicated and are generalisable	▪ Research has been a communal process, informed by participants, and scrutinised and endorsed by others.	▪ Can solve problems within a specific context. ▪ Solutions may be applied in other contexts, but as hypotheses to be tested. ▪ Unveil illusions
	Role of common sense	▪ None – only deductive reasoning	▪ Common sense reflects powerful everyday theories held by ordinary people ▪ Iterative and inductive reasoning used	▪ False beliefs that hide power and objective conditions

Source: Shtarkshall 2004

Deductive thought (ibid) includes within it the creation or designing of a theory, determining assumptions in relation to that theory and analysing those assumptions in the face of reality. This is the basis of the positivist/quantitative approach to research. The assumptions are inferred from a theory and examined in order to prove or disprove a theory.

Inductive thought (ibid) begins with observation or examination of events or specific processes in order to reach wider and more general statements based on these events or processes. The assumptions are inferred from the research results (the findings) and create a theory. This is the basis of the qualitative approach to research.

Table 1 cont. Research paradigms

Questions for analysing paradigms		Research paradigms		
		Positivism	**Interpretivism**	**Critical Theory**
Methodological questions	Role of researcher	▪ Objective, independent from the subject ▪ Investigator often controls the investigated	▪ Co-creator of meaning ▪ Brings own subjective experience to the research ▪ Tries to develop an understanding of the whole and a deep understanding of how each part relates and is connected to the whole	▪ Adopts role of facilitator – encouraging the participation and involvement of the 'subjects' who become partners in the research process
	Role of values	▪ Science is value-free ▪ Values have no place in research – must eliminate all bias	▪ Values are an integral part of social life – no values are wrong, only different	▪ Facts can never be isolated from values ▪ Values of the researcher influence the research
	Methods	▪ Empirical ▪ Structured and replicable observation ▪ Quantification / measurement ▪ Experimental – directly manipulate variables and observe	▪ Unstructured observation ▪ Open interviewing ▪ Discourse analysis ▪ Try to capture "insider" knowledge	▪ Participatory action research ▪ Dialogical methods – which encourage dialogue between researcher and researched

	Type of studies	▪ Survey studies ▪ Verification of hypotheses ▪ Statistical analysis ▪ Quantitative descriptive studies	▪ Field research, conducted in natural settings in order to collect substantial situational information	

Source: Shtarkshall 2004

Research Approach

Inductive reasoning applies to situations where specific observations or measurements are made towards developing broader conclusions, generalizations and theories (Saunders et al 2003). Opposed to inductive reasoning is deductive reasoning, where one starts thinking about generalizations, and then proceeds toward the specifics of how to prove or implement the generalizations (ibid), mostly applicable in disciplines where agreed facts and established theories are available (Remenyi et al 2000). From **Figure 3**, listing the main differences between deductive and inductive research approaches, an inductive research approach is considered the most appropriate for an interpretivistic research philosophy.

Figure 3. Deductive and Inductive Research

Deduction	Induction
• Scientific principles • Moving from theory to data • Need to explain causal relationships between variables • Collection of quantitative data • Application of controls to ensure validity of data • Operationalisation of concepts to ensure clarity of definition • Highly structured approach • Researcher independence of what is being researched • Necessity to select samples of sufficient size in order to generalize conclusions	• Gaining an understanding of the meanings humans attach to events • Close understanding of the research context • Collection of qualitative data More flexible structure to permit changes of research emphasis as the research progresses • Realization that the researcher is part of the research process • Less concern with the need to generalize

Source: Saunders et al 2003 p.89

Although involving some elements of an inductive approach, this research can best be classified as deductive. Deductive reasoning is the dominant research approach in the natural sciences, where

'laws provide the basis of explanation, permit the anticipation of phenomena, predict their occurrence and therefore allow them to be controlled' (Hussey et al 1997, pp 52).

As is the case in this study there is the search to explain the causal relationship between variables and establish ***"The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Lifestyle Changes for Adults in Cyprus***. With the prove of the effectiveness of the behaviour modification for weight management, the write up of the *Protocol with the guidelines for weight management for the Health Professional* was possible. Therefore, the research questions that required the investigation of the variables were developed. To investigate these research questions the researcher used structured questionnaires and checklists for the collection of quantitative data.

Combining Approaches

It may be advantageous to combine methods. If there is a wealth of material which it is easy to define a hypothesis the choice is the deductive approach. If the field is new and the data needs to be generated and reflect on the themes, the choice is inductive. Accordingly, there are two major advantages in the application of multi-methods: first, different methods can be used for different purposes in the study so as to gain more confidence that one is addressing the most important issues, and the second advantage is that it enables triangulation, or the use of different data collection methods within one study in order to ensure that the data are clear, valid and reliable. (Saunders et al 2003) Triangulation, the application and combination of several research methodologies in the study of the same phenomenon, is a widely used method in the social and behavioural sciences (Denzin 1994; Pelto and Pelto 1990). This framework is the preferred line in social sciences and behavioural modification. Weight management and behavioural modification are complex phenomenon with different parameters involved. The study of

such a complex human behaviour with diverse characteristics cannot be adequately explained and conceptualized using a single approach or methodological framework. The adoption of triangulation is thus significant in conceptualizing a theoretically complex phenomenon such as behaviour and weight management. In reflection to this study, the methodology of the proposed project was based on a triangulation framework.

The ability to blend, and use methods, which are appropriate for each individual piece of research, is an important issue for researchers and students to realise and incorporate into their research. Crotty (1998) supports this by arguing that we should accept that, whatever research we engage in, it is possible for either qualitative methods or quantitative methods, or both, to serve our purposes.

The use of both inductive and deductive approaches is important as the research uses 'Grounded Theory'. Glaser and Strauss (1967) initially introduced Grounded Theory where theory is generated or derived from data, systematically collected and analysed through the research process. This use of induction and deduction is supported by Bryman and Bell (2003) who argue that grounded theory is an iterative process which includes elements of both induction and deduction. Hussey and Hussey (1997) cited in Saunders et al (2003) refer to grounded theory as having both inductive/deductive elements, that is, theory being grounded in such continual reference to the data. This, again, seems to contradict, how many texts refer and introduce the role of induction and deduction within the research process. The emergence of social sciences in the 20th century led social science researchers to be wary of the deductive approach. (ibid)

Therefore for researchers and students to state transparently what their philosophical and methodological stance is, and more importantly the relationship between the two requires a great deal of understanding and level of sophistication. Unfortunately this concept of stating clearly and transparently that the piece of research, in question, is using for example a multi method approach is not that common within the research literature and has traditionally caused much debate. Mingers (2003) argues that *multimethod research was quite scarce*.

As Dreher and Hayes (1993) postulated, by using a combination of empirical as well as theoretical paradigms, the various components of a triangulated design inform each other and increase the capability to answer research questions. Consequently, confidence in findings is increased.

Rationale for the Research Approach

The incidence of overweight and obesity worldwide has reached epidemic proportions. Physical inactivity and poor diet have been identified as primary contributors to the leading causes of death in the developed countries.

It is unfortunate that more emphasis is given to calorie restriction dieting than physical activity, in achieving and maintaining weight loss. The reason for that is basically the slow metabolic rate. The fact is that incorporating appropriate and sufficient physical activity into one's life is an essential component of achieving a healthy body weight.

Traditionally, exercise has been viewed as a universal panacea, providing a wide range of both physical and psychological benefits. Moderate amounts of physical activity have been shown to reduce the risk of premature mortality from all causes and from coronary heart disease specifically. Numerous studies have linked regular physical activity with improvements in the function of muscles and joints, achieving peak bone mass, fine-tuning metabolic homeostasis, achieving endocrine and immune system health, and enhancing mental health. In the dietary Guidelines for Americans the benefits of regular physical activity are well known and include such things as increased physical fitness, building and maintaining healthy bones, muscles and joints, building endurance and muscular strength, weight management, etc.

For health care practitioners engages in lifestyle counseling as part of their nutrition and health services, personalization of energy requirements could add an exciting dimension to their practice. Often a client's interest is stimulated and motivation elevated when personalized information is provided. This can lead to a better compliance with the prescribed dietary and/or exercise regime.

Table 2 – Health Benefits from a 10 kg Weight Loss

Mortality:
• Decrease > 20% of total mortality • Decrease > 30% of diabetes incidences • Decrease > 40% of obesity and cancer
Blood Pressure:
• Decrease 10 mm Hg systolic • Decrease 20 mm Hg diastolic
Diabetes:
• Decrease 50% of fasting blood glucose
Blood lipids:
• Decrease 10% in total cholesterol • Decrease 15% in LDL • Decrease 30% in triglycerides • Increase 8% in HDL

Source: National Institutes of Health 1998

Research Strategy

The research strategy was a general plan of how to answer the research questions been set for this project. It contained clear objectives, derived from the research questions, specified the source from which we collected data, and considered the constraints that we had (for example access to data, time, location, and money, ethical issues). It is very important to use the correct research approach that it is appropriate for the particular research questions and objectives.

The different research strategies we consider here are:

- Experiment
- Survey
- Case study
- Grounded theory
- Ethnography
- Action research
- Cross-sectional and longitudinal studies
- Exploratory, descriptive and explanatory studies.

An important step in the research design is the choice of research strategy for collecting data. In this study the researcher applied one method of research strategy.

After an in-depth study and an evaluation of the different research strategies, the researchers have decided that the most appropriate approach for the pursuing of the research entitled is **Action Research**.

The proposed research utilized a participatory action research paradigm. A participatory action research is a significant methodology for intervention, development and change within organizations and groups. It refers to action research and intends to critically examine the current practice of an organization, programme (experienced as ineffective) in order to change and improve it. Information work is carried out in the context of organizations (Wilson 2000) and for the purposes of this study the set up of the organization is represented by the set up of the proposed Weight Management with Behaviour Modification Programme (WMBMP). Either:

- the work is done for people (for the purposes of the study the group of Weight Loss Candidate(s) with Behaviour Modification - WLCB) who work within organizations (in this case the WMBMP), or
- the work is done by an organization (in this case the WMBMP) for the benefit of the community (in this case the WLCB) at large.

Action research methodology aims at challenging traditional practice techniques and offering innovative ideas to deal with a problem. A participatory action research paradigm involves individuals or groups (within an organization/programme) and guides them to critically examine and reflect on the historical, political, cultural, economic and other contexts of a phenomenon (Wadsworth 1998). This critical study of a phenomenon, results in changes within the organization, its functioning and its decision making process (ibid). In reflection, the proposed research study aimed to provide efficient suggestions and recommendations based on research findings as well as empirical findings of the two researchers in weight management, for behavioural modification and changes to be made in the profession of dietetics in Cyprus with an ultimate goal to be used by the Ministry of Education and Culture and the Cyprus Dietetic and Nutrition Association, which both are considered stake holders of the project.

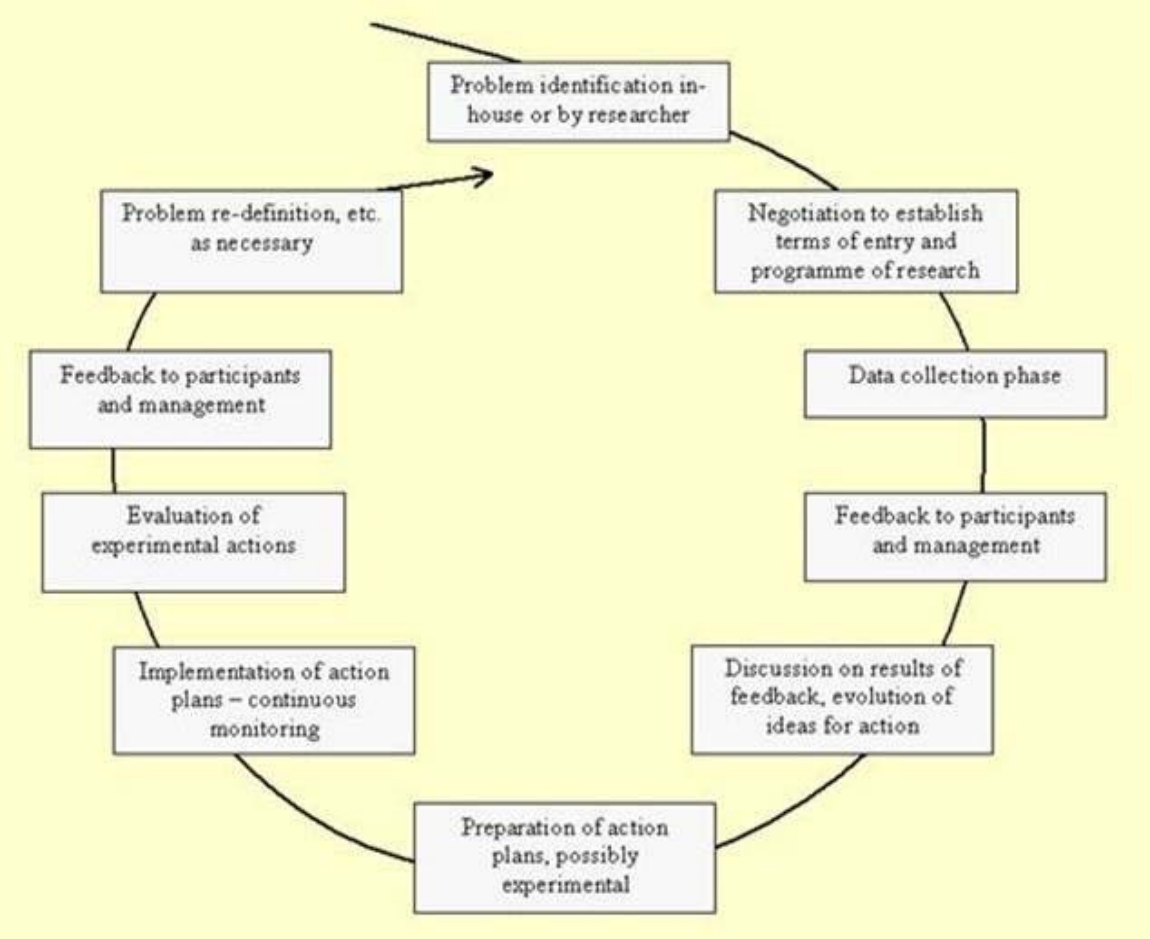
Action research is intended to improve a real life problem situation by:

- Identifying and clarifying the problem
- Implementing the change intended to improve the situation
- Evaluating the situation to determine the impact of change

The process of an Action Research is comparatively easy to describe, eventhough problems are likely to arise at almost any stage of the programme. **Figure 4** is an endeavor to illustrate the essentially cyclical nature of the process of action research as described by Wilson (2000). In theory the process could continue indefinitely but, clearly, at some point an optimum position (at this study the weight management and

maintenance accompanied by some changes in the behaviour regarding eating and exercise) may be reached with regard to whatever aspect of WMBMP functioning is under investigation to allow the outside researchers to withdraw. On the other hand, the research element in the process may be taken over by organizational members themselves (WLCB) and continued until an acceptable position is reached.

Figure 4. Cyclical nature of Action Research



Source: Wilson 2000 p.21

It follows an analysis of the cyclical nature of Action Research and a reflection to the project at issue.

Problem Identification: The problem identification of this project was the hypothesis presented in chapter 1 '*Research shows that the behavioural modification techniques were the most effective way to achieve and maintain weight loss comparing to diet alone. If the candidates (Weight Loss Candidate with Behaviour Modification-WLCB) used the specific behavioural modification techniques regarding eating and physical activity, then at least two thirds of them would achieve a weight loss of average ½ -1kg per week for the 18 weeks of the treatment and then maintain it or continue to lose after treatment termination with a total treatment period of 36 weeks efficiently and long-lasting compared to the control candidates who followed a diet plan only.*' The questions supporting the problem identification are the research questions of this project

'*1. How can we measure specific Eating Habits and Physical Activity through the use of Behaviour Modification techniques to promote an Active Lifestyle and sound Nutritional Habits for overweight/obese adults?*

2. Is behavioural modification for eating habits and exercise an effective way to treat obesity/overweight in terms of weight loss and maintenance?

3. Does the weight loss that results from a behaviour modification in combination with exercising and dieting outweigh or not outweigh the weight loss from dieting?

4. Is there a link between behaviour modification along with nutrition and exercise intervention and maintenance of the weight lost?'

Negotiation: Because action research requires an organizational or community setting (for the purposes of this project is the setting for the WMBMP) the key element in the total process for this project was *negotiation*: this meant to agree with the researchers on the conditions under which the research was permitted, on the rights of the WLCB, and on the rights of the researchers.

The process of negotiation whereby agreement on the issues was reached was affected initially by whether the approach was from the WMBMP to the researcher, or from the researcher to the WMBMP. In the first case the organizational problem had been

recognized by someone in the WMBMP who asked for research help; in the second case the possibility of a problem or set of problems was assumed by the researcher who then searched for an organizational setting for the work.

Data collection: all standard methods of data collection may be employed in an action research programme. In the work described in the following sections it will be noted that observation and interviewing were chiefly employed but self-observation through diary-keeping, researcher-completed questionnaires, self-completed checklists, activity records, and the analysis of documents were all appropriate. The nature of WMBMP, the degree of co-operation that can be achieved, and the researchers' aims influenced the final choice. Therefore, the study to be presented is quantitative as well as qualitative. It is also an observational - longitudinal study with structured method the most proper techniques are the questionnaires (set questions, interviews-behaviour modifications), anthropometric measurements, interviews, checklists and observational structured methods.

Data feedback: is an essential element in action research, which distinguishes it from much other research. Much research is never reported directly to those from whom the data were collected but, in action research, feedback is essential if management and other organizational members (for this case the WLCB) are to be persuaded of the need for action. Although the feedback can be done orally or written, for the purposes of this study was done by oral presentation at meetings and by written remarks at their checklists and activity logs. The use of the data in in-house discussions was an effective way to give feedback.

Discussion: follows naturally upon the feedback phase, particularly in oral presentations and discussion programmes. For the specific study, ideas for action emerged early in an observation phase but the researchers' ideas were modified in the course of translating them into action.

Action plans: are simply the conversion of the previous discussions into statements of intent and detailed descriptions of changes to be made or innovations to be introduced

into a system. A detailed time-table was needed and a clear consideration was established of the different needs of the researchers and the WLCB.

Implementation and monitoring: the idea of 'implementation' is self-explanatory; the action plan is put into effect, the intended time-table is adhered to (as far as possible), and the separate activities that constitute the change or novelty are boarded upon. What put the research element into this was the monitoring process. Monitoring was simply another phase of data collection. Monitoring involved the collection of records of various activities (for example, the use of eating and exercise logs).

Evaluation: involves the assessment of all data collected during the monitoring process (both quantitative and qualitative) with a view to determining the 'success', 'usefulness', or 'value' of the innovation. In many cases value judgments were jumped to enter into the treatment of-data, mainly in the weight given to different kinds and sources of data. Such value judgments were clearly exposed to the WMBMP in the next phase.

Feedback: the monitoring process was necessary to enable the WMBMP to decide whether to continue an innovation, extend its scope, change it in some way indicated by the data, or end it. So that the appropriate decision can be reached it was necessary to engage in another feedback round (written or oral) which at this case was written with the 'progress report' and the individual discussions with the WLCB.

Problem re-definition: if any action other than ending the innovation results from the evaluation it will be necessary to redefine the problem and engage in another round of data collection, action planning, etc. At this stage the researchers could have withdrawn, leaving the WMBMP to pursue the research process alone, might have remained as an advisor giving technical assistance on method, or might have remained fully involved. Clearly, that depended upon the needs and wishes of the WMBMP and upon the availability of research funds and for the purposes of this study was not considered necessary as the results for the specific group examined were positive.

According to Blaxter et al (2001), action research is educative problem focused and involves a change intervention. The aim of action research is improvement and

involvement since it deals with individuals as members of social groups. Those involved in the research process are also participants of change.

In the case weight management, behavioural modification interventions, nutritional and exercise habits and assessment of behaviour will be examined and evaluated. Its different contexts will be studied and suggestions for change will then be provided through the action research programme.

A **longitudinal study** is a correlational research study that involves repeated observations of the same items over long periods of time (Rosenbaum 2002). It is a type of an observational study. Longitudinal studies are often used in psychology to study developmental trends across the life span, and in sociology to study life events throughout lifetimes or generations. Because of this benefit, longitudinal studies make observing changes more accurate and they are applied in various other fields. As most longitudinal studies are observational, in the sense that they observe the state of the world without manipulating it, it has been argued that they may have less power to detect causal relationships than do experiments. But due to the fact that the repeated observation at the individual level, they have more power than cross-sectional observational studies, by virtue of being able to exclude time-invariant unobserved individual differences, and by virtue of observing the temporal order of events. In health studies, this design is used to uncover predictors of certain diseases (Rosenbaum 2002).

Types of longitudinal studies include cohort studies and panel studies. Cohort studies sample a cohort, defined as a group experiencing some event (typically birth) in a selected time period, and studying them at intervals through time. Panel studies sample a cross-section, and survey it at (usually regular) intervals (Rosenbaum 2002).

The reason longitudinal study was used for this study was that unlike cross-sectional studies, longitudinal studies allowed to track the same people-samples to be examined for behavioural modification techniques for weight achieving and maintenance, and therefore the differences observed in those people are less likely to be the result of cultural differences across the time.

The type of longitudinal study to use for this joint project was panel study as a sample was chosen and it was evaluated at regular intervals.

Research Techniques

Questionnaire and Interview

According to Beatty (2004), asking questions can provide measurement of many concepts and variables important to transportation research. Transportation practitioners ask questions frequently as part of assessment and evaluation. The important thing to remember when choosing this method is that it must be the most appropriate one to measure the variables as they have been defined.

The major difference between questionnaires and interviews is the presence of an interviewer. In questionnaires, responses are limited to answers to predetermine questions. In interviews, since the interviewer is present with the subject, there is an opportunity to collect nonverbal data as well and to clarify the meaning of questions if the subjects do not understand.

The written questionnaire has some advantages. For one thing, it is likely to be less expensive, particularly in terms of the time spent collecting the data. Questionnaires can be given to large numbers of people simultaneously; they can also be sent by mail. Therefore, it is possible to cover wide geographic areas and to question large number of people relatively inexpensively.

Another advantage of questionnaires is that subjects are more likely to feel that they can remain anonymous and thus may be more likely to express controversial opinions. This is more difficult in an interview, where the opinion must be given directly to the interviewer. Also, the written question is standard from one subject to the next and is not susceptible to changes in emphasis as can be case in oral questioning. There is always

the possibility, however, that the written question will be interpreted differently by different readers, which is one reason for carefully pre-testing questionnaires.

Interviews have many advantages, the most significant of which is questioning people who cannot write their responses. This category also includes illiterate subjects or subjects who do not write as frequently as they speak. Oral responses from these individuals will contain much more information than would their written responses. Another advantage of the interview method is that is actually results in a higher response rate than does the questionnaire. Many people who would ignore a questionnaire are willing to talk, with an interviewer who is obviously interested in what they have to say.

Another advantage of the interview technique is that questions can be asked at several levels to get the most information from the subject. This approach is unique to the interview. The combination of structured and unstructured questions can provide depth and richness to the data and, at the same time elicit data that are comparable from one subject to the next.

When looking for a questionnaire or interview schedule to use in the study or when developing an individual, the various kinds of questions need to be considered in order to to obtain a range of data, and then decide which method is best suited to the specific variables. The content of the questions must be considered first, then the amount of structure in the format.

Question content or the purpose of the question falls into two basic categories: those aimed at facts and those aimed at perceptions or feelings. Factual questions ask subjects for information about themselves or about even or people about which they know something.

Nonfactual questions deal with the subjects' perception of what happened or their feelings about people, events, or things. They may also deal with the subjects' reasons for their behaviour. In these kinds of questions, the interest is not in whether the subject's report is accurate but rather in the subject's perception, which may or may not accurately reflect the facts.

The format of interviews and questionnaires, as that of observational methods, can range from very structured to very unstructured, depending on how much is known about the range of possible responses. In table 3 shows the advantages of interview and questionnaire.

Table 3 - Criteria for Selecting the Interview or Questionnaire

Advantages of the Interview	**Advantages of the Questionnaire**
The subject needs be able to read or write	This approach is less expensive in terms of time and money
The interviewer can observe the responses of the subject	Subjects feel a greater sense of anonymity
Questions may be clarified if they are misunderstood	The format is standard for all subjects and is not dependent on mood of interviewer
An-depth data may be obtained on any subject and are not dependent on predetermined questions	Large samples, covering large geographic areas, compensate for the expected loss of subjects
There is a higher response and retention rate	A greater amount of data over a broad range of topics may be collected

Source: Beatty 2004

Checklists

Structured observation can take one of several forms, but perhaps the most common is the **checklist.** A checklist allows the researcher to record whether or not a given behaviour occurs. The desired behaviours must be explicitly defined so that there is no question in the mind of the observer as to whether or not they occur (Willett et al 1998).

Structured observation, when appropriate, is a first-rate method of collecting data. Many more subjects can be observed, in less time, than with unstructured observation, and the data analysis is much simpler. Taking results from a checklist merely involves counting how many times a particular behaviour occurred. The results of unstructured observation, on the other hand, consist of quantities of descriptive data, since the observer was trying to record everything that happened. These data must be sorted out to see if there are any patterns to the observed behaviour-a very time consuming process (von Elm et al 2007).

Behaviour Modification Techniques

Behaviour modification is the use of empirically demonstrated behaviour change techniques to improve behaviour, such as altering an individual's behaviours and reactions to stimuli through positive and negative reinforcement of adaptive behaviour and/or the reduction of maladaptive behaviour through positive and negative punishment (Martin 2007). The components of the behavioural modification techniques were derived from a functional analysis of target behaviours (involving the systematic examination of factors preceding and following the behaviours) and the manipulation of such factors in a problem-solving, therapeutic framework (Foreyt 2000).

Self-monitoring is the core of all behavioural programmes and consists of self-observation and self-recording of those observations. Therefore, the subjects participating at the project will be required to keep and food and activity diary. The situational factors, behaviours, thoughts, and feelings that occur before, during, and after attempts at prudent eating and exercise behaviours are recorded. Self-monitoring may

prevent inappropriate behaviour because the patients know that their recorded indiscretions will be scrutinized by a therapist or peer (Foreyt 1991). Early studies found that patients spontaneously reduced calorie intake when daily diet records were kept. Patients who monitored their caloric intake and expenditure lost more weight than did those who did not use self-monitoring (Perri et al 1989). Several studies have found good correlations between self-monitoring and weight loss (Perri et al 1989) (Dubbert 1984) and maintenance (Kayman et al 1990) (Hartman et al 1990), although self-monitoring and success could both be caused by a third motivational factor (Foreyt 1991).

Stimulus control involves the modification of cues leading to inappropriate eating or exercise. Early theories suggested that obese persons were particularly sensitive to environmental cues and less sensitive than nonobese persons to internal, hunger cues (Schachter 1971); (Rodin et al 1981). Later research indicated that such sensitivity is not confined to obese persons and that not all obese persons are particularly sensitive (Rodin 1981). Although little research has compared behavioural treatments with and without stimulus control, the concept of controlling the environment is widely accepted as clinically effective. Control of food cues may help eating management because exposure to such cues has been shown to produce physiologic reactions such as insulin shifts, which may predispose one to overeat (Rodin 1981).

Contingency management will be used in order to involve the application of rewards for appropriate behavioural patterns leading to weight loss or maintenance (for example, buy a cloth accessory for achieving the weight goal). Contracts will be used to formalize agreements. Contracts will be short term and should focus on increasing healthful behaviours associated with weight loss rather than on weight loss itself. The effectiveness of contingency management usually ends when the rewards end. Initially, changes in eating and exercise habits may be intrinsically aversive; in such cases, artificial rewards for adherence are needed. Later, as the new eating and exercise behaviours become perceived as enjoyable and intrinsically rewarding, the contracts can be allowed to expire.

Alterations in behaviour topology through modification of the speed or intensity of target behaviours may be needed to optimize outcome. After all, reductions in the rate of eating

in response to behaviour therapy have been positively correlated with weight loss in the short term (Spiegel 1991). Gradual modification of eating behaviours away from dieting and meal skipping toward more normal eating patterns (three meals a day) using a gradual substitution of lower-fat alternatives may be needed to avoid feelings of deprivation that could trigger lapses in eating control. Similarly, healthful exercise habits will be developed gradually to allow for cardiorespiratory adaptation and to avoid the subject's perception that exercise is punishment.

Cognitive-behavioural strategies will be used to help move thinking patterns away from self-rejection and toward self-acceptance. The focus will be on the ways in which thoughts, moods, diets, and social pressure to be thin affect eating control. About 40% of all obese patients seeking treatment suffer from binge-eating disorder, characterized by frequent and uncontrollable episodes of binge eating (Spitzer 1993). Cognitive-behavioural treatment for binge eating has been shown to be effective (Telch et al 1990) and may need to precede behavioural treatment of obesity. An approach using cognitive-behaviour treatment to reduce restrictive dieting appears to have alleviated much of the psychological distress associated with obesity (Polivy et al 1988). This joint project was a mean to determine whether such methods are effective in promoting and maintaining weight loss.

Functional Behavioural Assessment Method

Therapy and consultation cannot be effective unless the behaviours to be changed are understood within a specific context (Martin et al 2007). The process of understanding behaviour in context is called functional behavioural assessment (ibid). Therefore, a functional behavioural assessment is needed before performing behaviour modification. One of the simplest yet effective methods of functional behavioural assessment is called the "**ABC**" approach, where observations are made on Antecedents, Behaviours, and Consequences. In other words, "What comes directly before the behaviour?", "What does the behaviour look like?", and "What comes directly after the behaviour?" Once enough observations are made, the data are analyzed and patterns are identified. If there are consistent antecedents and/or consequences, then an intervention should target them in

order to increase or decrease the target behaviour. This method has formed the core of positive behaviour support (Martin 2007) for behaviour modification for children in school from both regular education and special education.

Behaviour modifiers like to employ a variety of evidenced-based techniques. These techniques intervene at all levels of context. For example, given specific setting events for a behaviour, a behaviour modifier may develop a neutralizing routine to eliminate that setting. If a behaviour pattern has a specific antecedent of trigger, then an antecedent control strategy can be developed to train new behaviour in the presence of the trigger. If a problem behaviour readily occurs because it achieves some function, then an alternative behaviour can be instructed and trained to occur in the context of the trigger (Waguespack et al 2006); (Roberts 2001).

For example, in our proposed research during the initial interview if the subject (client) does not like exercise but he/she likes dancing and music, then the antecedent is a kind of activity that is not considered exercise, the behaviour is to start dancing instead of a formal exercise and the consequence is to find out a new type of activity (i.e. dance) that he/she really enjoy.

If a behaviour is particularly complex it may be task-analyzed and broken into its component parts to be taught through chaining. While all these methods are effective, when the behaviour problem gets difficult or when all else fails many turn to contingency management systems (Mclntosh et al 2007). Complex and comprehensive contingency management systems have been developed and represent effective ways to eliminate many problem behaviours (i.e, applied behaviour analysis and positive behaviour support). Collabortive goal setting with the client enhances treatment effects (Waguespack et al 2006).

How to Change the Antecedents

Changing the antecedents or triggers involves the following: the carer may do their utmost to create a calm, tranquil, supportive environment to provide a most conducive to recovery setting as possible. Trying to stick to non-threatening or pleasurable conversations such as topics relating to holidays past/future is a positive step. Playing peaceful music can also help the sufferer to feel less anxious during meal times. Further distraction methods such as pre-planning a specific game (the geography game for example) or asking another family member to talk about the best parts of their day may also be beneficial.

How to Change the Behaviours

In order to help the individual suffering from an eating disorder the carer may need to become aware of how best to practice assertiveness skills. Ideally, the carer will be most effective if they are able to remember the key "C's" as highlighted by Treasure et al (2007); remain calm, consistent, clear, compassionate, caring and concerned. Motivate and encourage through acting as a meal coach but be careful not to collude with the eating disorder for example by providing constant unhelpful reassurance about food, size or weight.

How to Change the Consequences

Changing the consequences primarily involves helping the sufferer to manage their extremely uncomfortable and difficult to manage feelings of anxiety and loss of control. This may be achieved through the pre-planning of suitable distraction activities, relaxation or means to provide a cathartic release such as through painting or writing key thoughts down in a journal.

Source: Treasure et al 2007

Anthropometric Measurements

The under sampling population (as the population-objective) included only overweight/ obese Cypriots between 18-51 years derived from the two researchers clientele. A sample of 315 individuals was selected with the method of stratified random sampling with proportional percentage of women (51.5%) and men (48.5%). The particular size of sample was decided because it gave the biggest sampling fault on the statistics up to 5.5 %, with a degree of confidence up to 95%. After the subjects were selected, they were coded, registered and treated electronically in the computational *Statistical Package for Social Sciences* (SPSS). The results from SPSS were undergone a detail analysis of elements that derives from each question. Also, the cross-correlation between the variables (correlations) and the cross tabulations of the questions were examined so that conclusions and guidelines of nutrition and exercise to be derived. The evaluation of eating and exercise habits of obese and excess body weight (overweight) samples was done with the use of anthropometric indicators of Body Mass Index (BMI), Waist Circumference (WC), and Total Body Fat Percentage (TBFP), and nutrition and fitness assessment questionnaire. These indicators were considered as simpler, more functional and more economic methods for use in big number of individuals and action research.

The reliability and the objectivity of BMI are evaluated as excellent and its validity as average. The reliability and the objectivity for the WC were evaluated as very good, and the validity of this method as good. The reliability of measurements was checked with the measurement with the method of Bioelectrical Impedance (BIA) for the measurement of body fat. The following results are available from BIA on the constitution of body: percentage of fat, kilos in fat, percentage and kilos of lean body mass, percentage of water, litres of water, and calories of basal metabolic. Where the increased BMI did not correspond in overweight, but in increased muscular mass and in individuals with height smaller than 1.6 metres. Also, in the pointing out of individuals with decreased muscular mass (for example, old men who have normal BMI, while actually be underweight with BMI < 20). The repetition of the measurements was ensured with written directives to the observers and with experimentation in test sample of individuals.

Methodology

The primary purpose of the research study is to investigate ***the use and effectiveness of Behavioural Modification Techniques in achieving and maintaining normal weight and fitness and to set the guidelines for the lifestyle changes for weight management in Cyprus.*** An additional purpose of this study was to develop a protocol as a mean of a behavioural approach to be used by dietitians and other health professionals for the treatment of obesity adjusted to the needs of the Cypriots adult population. The ultimate goal was the reduction of the obesity epidemic in Cyprus.

After evaluating all possible data collection methods we choose the most appropriate (interviewer administered questionnaires) in order to answer the research questions. The research involved the two primary stakeholders related to nutrition/dietetic matters and education; the Cyprus Dietetic Association and the Ministry of Education. The group examined was a representative sample of the clientele of the two researchers with a BMI above 20.

The study is **quantitative** as well as **qualitative** with the type of action research approach. It is also an **observational - longitudinal study with structured** method the most proper **techniques** are the **questionnaires** (set questions, interviews-behaviour modifications), **anthropometric measurements, interviews, checklists and observational structured methods**.

Specifically, for the purposes of this project, the following methodological and empirical paradigms were studied:

1) A thorough literature review to identify all relevant materials (behavioural modification in weight management), in educational press, academic journals, text covering policy in health and education, on-line journals, relevant dietetic, nutrition and educational websites, books
2) Quantitative analysis of self-reported questionnaires
3) Qualitative in depth personal interviews and focus group (in depth-understanding of behaviour and of the reasons that govern this kind of behaviour in nutrition and exercise)

4) Observational research (Systematic participant observation).
5) Design and implementation of a survey (including research design, research questions, hypotheses, sampling frame and methods, data collection, validity and reliability tests and data analysis).
6) Data Coding and input
7) Data analysis using SPSS

In statistics, the goal of an **observational study** is to draw inferences about the possible effect of a treatment on subjects, where the assignment of subjects into a treated group versus a control group is outside the control of the investigator. This is in contrast with controlled experiments, such as randomized controlled trials, where each subject is randomly assigned to a treated group or a control group before the start of the treatment. Observational method varies greatly in terms of the amount of structure provided for the observer. The structured method provides a complete list of expected behaviours and requires only that the observer check which ones occurred (Rosenbaum 1997).

A major challenge in conducting observational studies is to draw inferences that are acceptably free from influences by overt biases, as well as to assess the influence of potential hidden biases. In observational studies, investigators may use propensity score matching (PSM) in order to reduce overt biases. Furthermore, it should be realized that complete recording of an event is virtually impossible. Even with videotaping, exact replication will not be obtained because of biases. As soon as the observations will began, they will be given structure by the editing process. In reflection to our study, we will use videotaping upon permission of the participants, especially at the support groups and the individualised consultation sessions in order to make possible the observation to its greatest extent (Von Elm et al 2008).
For the purposes of the proposed research and based on the description of the observational studies, we concluded that there was the need to use two major observational groups. The two groups are the control and the intervention groups:

1. **Control Group** (Group 1) – this group followed a diet-controlled calorie restricted programme which it was common for both researchers.
2. **Intervention Group** (Group 2) – this group followed the same dietary guidelines as the Control Group. In addition, it followed the suggested

Therapeutic Lifestyle Changes (TLC) suitable for nutrition intervention (implemented by the researcher: Eleni Andreou), the exercise guidelines suitable for physical activity intervention (implemented by the researcher: Christiana Philippou) and behaviour modification guidelines.

Structured observation can take one of several forms, but perhaps the most common is the **checklist.** A checklist allows the researcher to record whether or not a given behaviour occurs. The desired behaviours must be explicitly defined so that there is no question in the mind of the observer as to whether or not they occur (Willet et al 1998).

Structured observation, when appropriate, is an excellent method of collecting data. Many more subjects can be observed, in less time, than with unstructured observation, and the data analysis is much simpler. Taking results from a checklist merely involves counting how many times a particular behaviour occurred. The results of unstructured observation, on the other hand, consist of quantities of descriptive data, since the observer was trying to record everything that happened. These data must be sorted out to see if there are any patterns to the observed behaviour-a very time consuming process (von Elm et al 2008).

The unique characteristics of the group under investigation necessitated the utilization of a structured *questionnaires.* Respondent completion could have been cheaper and quicker but often results in low response rates, which could introduce bias in the results because those who chose not to respond or were unable to respond, may differ from those who did respond. In terms of design, respondent-completion questionnaires should ideally consists of 'closed' questions – that is, questions which can be answered by ticking boxes. 'Open-ended' questions - where respondents have to write out their answers should be avoided, since they invariable achieve only low response (Veal 2006).

Although questionnaires may be used as the only data collection method, it is usually better to link other methods in a multi-method approach. In addition questionnaires, if worded correctly, normally require less skill and sensitivity to administer than semi-structured or in-depth interviews (Jankowicz 2000).

In order to avoid low response rate, sensible reminder and follow-up procedures are perhaps the most significant tool available to the researcher.

Structured questionnaires and interviews are those in which the questions are presented in exactly the same way, with the same wording, and in the same order to all subjects. The questions are standardized to ensure that the subjects' answers can be compared. The questions can be asked by an interviewer or can be given to the subject as a "paper-pencil test"; in either case, the questions are asked in the same order for all subjects so that the order of the questions cannot affect the subjects' responses.

The most structured questions are fixed alternative questions which the subject is asked to choose one of the given alternatives. Two examples of fixed alternative questions are as

A. Check the response that best describes how you level of satisfaction with planned road.

Very satisfied
Satisfied Agree
Not Satisfied Neutral

B. Which of the following is your choice of specialty area? Choose only one:

1. Driver
2. Material Supplier
3. Passenger

Questions such as these are the same whether used in a questionnaire or in an interview. They are more commonly used in questionnaires but may be used in interviews, particularly if the subject is unable or unwilling to fill out a questionnaire.

In exploratory research, it may not be appropriate to structure the interview questions in advance, other than to decide on the opening statement or question. A flexible interview, properly used can bring out much useful material because it allows the interviewee to pursue whatever seems important to the subjects and thus elicit the

→subjects' values, beliefs, and attitudes. Their responses will be completely spontaneous, self revealing, and personal.

The flexibility of the interview is both an advantage and disadvantage to the researcher. The results will not be comparable from one subject to the next because the interview format is never the same. However, the interview is invaluable in exploring the whole range of attitudes, thoughts, and feelings that exist for the topic.

A questionnaire is difficult to be unstructured. Some degree of structure is always required because the questions must be set in advance and cannot change them according to the subjects' responses. Questions that do not have fixed alternatives, however, are much less structured than those that do, because they require subjects to respond in their own words. The extent of the response that the subject must provide to answer the question will vary from a word to a sentence, a paragraph, or even an essay. The least structured questionnaires are those designed to elicit extensive response from the subject.

Open-ended questions are less structured than the fixed-alternative kind and give subjects more leeway to provide their own answers. The question is designed to allow the subject a free response rather than a response limited to or guided by given alternatives.

With questionnaires, interviews, and observational methods, the level of the study is related to the degree of structure in the measurement tool. Unstructured interviews are appropriate for Level I studies but not for Levels II and III.

Starting at Level II, questions must be standardized with fixed alternatives so that the responses of subjects can be compared. In addition, the responses at Level III must be sensitive enough to distinguish small differences between experimental and control groups; this task involves structured questions may be used at Level III.

In the proposed study, more structured questions with rating will be asked at the questionnaire. For example,

_____ How many whole grain breads and cereals, raw fruits and vegetables, and bran products do you eat each day?

4 or more

3-4 servings

1-2 servings

none

In the contrary, in the interviews including the food diary, the subjects will be able to be flexible with the answers.

Review of Literature

The review of related literature provided information on ***"The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Lifestyle Changes for Adults in Cyprus".*** The review of related literature utilised a variety of sources including a computerised search of biomedical literature from PubMed, Dissertation Abstracts International (DAI) provided further review of the literature.

These resources led to professional journals and books that provided the researchers with background information related to the study, possible research designs and methodology, and preparation for analysing the study data.

Population and Sample

Design and Sample

The study design of the project was *Methodological triangulation* as it involved using more than one method (empirical vs. action research and qualitative vs. quantitative) to gather data, such as interviews-checklists, observations, questionnaires, and anthropometric measurements.

The study was quantitative and qualitative in nature using a combination of an action research and empirical approach. In the current study, action research referred to changing the behaviour of the intervention group to promote weight loss by changing their eating and physical activities habits through. At the same time, the research was also empirical as it has based its findings (weight fluctuation) on direct or indirect observation (anthropometric measurements, checklists, activity/ dietary log). The study was also observational and longitudinal using structured methods for the selection of a representative sample of adults 18-50 years of age investigated for 36 weeks. Potential influences on the data analysis of this project were overcome by using different data collection instruments (i.e. interview, questionnaire, checklist, food diary, and activity log). Therefore, the methodology of the proposed project was based on a triangulation framework in order for more than two methods to be used in the study with a view to double (or triple) checking results. This framework was the preferred line in social sciences since it helps to overcome the limitations of intrinsic biases (Cohen 2001). The adoption of triangulation was thus significant in conceptualizing a theoretically complex phenomenon such as behavioural modification in weight management.

The reason that longitudinal study design was used was that unlike cross-sectional studies, longitudinal studies allowed the tracking of the same people-samples to be examined for behavioural modification techniques for weight achieving and maintenance, and therefore the differences observed in those people are less likely to be the result of cultural differences across the time. The type of longitudinal study used for this project was a panel study as a sample was chosen and it was surveyed at regular intervals. Furthermore, at the proposed study checklists of behaviours were developed. Two main categories made up the checklist: the dietary/activity changes and the lifestyle changes.

The subjects of the study were randomly selected by the associate statistician of the research from the authors' clientele in Cyprus (quantitative style). In this study, the target audience was (equally divided in number by both partners while observed as a whole by both of them) the overweight/obese Cypriot clientele ranking in the age group of 18 to 50 years (qualitative style). In order for the study to be statistically correct the sample of 315 people will be examined.

The characteristics of the study are summarized in table 4.

Table 4. - Summary of Characteristics of the Study

Summary of Characteristics of the proposed study with Triangulation framework

- **Participatory action research and combination of empirical paradigm**

1. Critical examination of existing practices for weight management programmes and techniques
2. Develop new and innovative ideas to deal with the problem of weight achieving and maintenance (action research)

- **Intervention & Control Group**
- **Quantitative analysis** (numerical based on questionnaires, food and activity diary, anthropometric measurements, Behavioural Modification –Checklists -structured, observational).
- **Qualitative analysis** (based on individual interviews, individual/ group counselling, support group)
- **Observational - longitudinal research/ participant observation** (same group of people observed over a period of time for 36 weeks)
- Study with **structured** method.
- Design and Implementation of **a panel study (cohort)** (including research design, research questions, hypotheses, sampling frame and methods, data collection, validity and reliability tests and data analysis).

1. Quota* and Systematic** Random sampling
2. Surveyed at regular intervals.

- Data Coding and input.
- Data Analysis

1. SPSS
2. Data coding
3. Nutritional Analysis and Energy Expenditure

(use of Food Works- nutrient analysis and energy expenditure software)

- Results/Findings/ Conclusions

**Quota Sampling -the sample size is obtained by using the most accessible patients, as long as they represent the identified groups*

***Systematic Sampling - Selecting members of a sample that allows only chance and a "system" to determine membership in a sample*

Subjects and Procedures

The study population comprised: Obese-overweight (BMI 25-30 kg/m^2) and obese (BMI>30 kg m^2) women and men, aged 18-50 years or more, referred by a general practitioner or physician or visited the registered dietitians with their personal initiative due to weight problem, and enrolled in a weight management program with nutrition intervention. Demographic and validated Nutritional Assessment Questionnaires were given to the candidates (Appendix N). Obesity and overweight were defined using the current International Obesity Task Force (2002) definition. The Ethics Committee of Cyprus stated that it was not within its authority to grant approval for the study as no invasive practices were used.

(a) Demographic information

Demographic information was obtained by questionnaire and interview of the obese based on gender, age, ethnicity, marital status, education and occupational status. Candidates were randomly selected from the two researchers' clientele in the period 2007-2009 under the assumption that the clients formed a representative group of the people visiting any Registered Dietitian in Cyprus and derived from the fact that this was a work based program. In order for the study to be statistically correct a sample of 315 people was selected. A non-self-weighting sample, known as an EPSEM (Equal Probability of Selection Method) sample was the type of random sample as every individual in the population of interest (dietitian's clientele) had an equal opportunity of being selected for the sample. The method used was the usage of *Random number tables*. For this sample (as far as the size is concerned) the statistical error is 5.5%. This was calculated by a statistician at the University of Nicosia, based on the information given for obesity percentage in Cyprus of 18% for men and 21% for women (WHO 1991) and according to CyDA epidemiological study of obesity

(2009) the obesity/overweight percentage for men is 28.8%/ 46.9% and for female 26%/ 26.9%, respectively and the Cyprus population for 2001. Given this information the obese population in Cyprus is 70.000 (20%). The sample was derived from the five towns of rural and urban areas, with a total sample size of approximately 315 people. It had similar demographic characteristics and it followed under the definition of overweight/obese clientele ranking in the age group of 18 to 50 of age.

There was uniformity in the sample (treatment plan, sample criteria) as with the usage of the clientele's of the two researchers, consistency of the sample was ensured as far as the treatment is concerned and therefore avoiding the problem of drop out. The uniformity of the sample limited the biases of a research for a work based study.

The population distribution of the selected sample presented below in table 5 was selected based on the population status of the Cyprus Population Statistic Services (CySS 2007).

Table 5. Population distribution of the study.

MEN	NICOSIA RULAR	URBAN	LIMASSOL RULAR	URBAN	LARNACA RULAR	PAPHOS URBAN	RULAR	URBAN	FAMAGUSTA RULAR	URBAN
18-24	7	3	6	1	3	2	2	1	0	2
25-29	6	2	5	1	2	1	2	0	0	1
30-34	5	2	5	1	2	1	1	0	0	1
35-39	7	2	5	1	3	2	1	0	0	2
40-44	7	2	5	1	2	2	2	0	0	1
45-49	7	3	5	1	1	1	2	1	0	1
TOTAL	39	14	31	6	13	9	9	2	0	8
	131									

WOMEN	NICOSIA RULAR	URBAN	LIMASSOL RULAR	URBAN	LARNAKA RULAR	URBAN	PAPHOS RULAR	URBAN	FAMAGUSTA RULAR	URBAN
18-24	11	3	8	1	4	3	2	1	0	3
25-29	11	2	9	1	4	3	3	0	0	1
30-34	10	3	9	1	4	2	2	1	0	2
35-39	11	4	9	2	4	2	3	2	0	2
40-44	11	4	9	2	3	2	2	1	0	2
45-49	11	4	6	1	2	2	3	0	0	2
TOTAL	65	19	49	8	21	13	14	5	0	12
	206									

TOTAL	NICOSIA RULAR	URBAN	LIMASSOL RULAR	URBAN	LARNAKA RULAR	URBAN	PAPHOS RULAR	URBAN	FAMAGUSTA RULAR	URBAN
18-24	18	6	14	2	7	5	4	2	0	5
25-29	17	5	14	2	6	4	5	0	0	2
30-34	15	5	14	2	6	3	3	1	0	3
35-39	18	6	14	3	7	4	4	2	0	4
40-44	18	6	14	3	5	4	4	1	0	3
45-49	18	7	11	2	3	3	5	1	0	3
TOTAL	104	33	80	14	34	22	23	7	0	20
	337									

(b) Study Groups

There were two major observational groups:

1. **Control Group (Group 1)** – this group followed a diet-controlled calorie programme and it was commonly to both researchers. It is a fact, that a standard clientele for a dietitian is the one who after the nutritional assessment receives a diet plan or any nutritional guideline for a specific nutritional problem (i.e. weight management) (ADA 2005).

2. **Intervention Group (Group 2)** – this group followed the same calorie intake guidelines as the Control Group. In addition, it followed the suggested behavioural modification techniques for food (administered by Eleni Andreou) and the behavioural techniques for the exercise guidelines (administered by Christiana Philippou).

The sample size of the control and intervention group had a ratio (1:1) for most reliable results.

Characteristics of the Control Group (Group 1)

- n = 157 subjects.
- Age: 18-50 (based on the age breakdown of the guidelines of DRI-Dietary Reference Intake and levels of BMI for these age groups)
- Weight: Ideal Body Weight (IBW) + 15-20%
- Body Mass Index: > 25
- Waist Circumference: > 94 cm for men, > 80 cm for women

Characteristics of the Intervention Group (Group 2)

- n = 158 subjects

- Age: 18-50 (legal adults)
- Weight: Ideal Body Weight (IBW) + 15-20%
- Body Mass Index: > 25
- Waist Circumference: > 94 cm for men, > 80 cm for women

Both groups received an energy-restricted diet (1500 ± 200 kcal/day for women, 1800 ± 200 kcal/day for men) for a one week cycle. Furthermore, specific dietary, activity guidelines, behaviour modification consultation and guidelines were given to the intervention group. Each candidate had an individual consultation session with the dietitians. The initial consultation session lasted one hour and the follow up sessions will be 20-30 minutes each.

Individualised diet plans, personalised physical activities as well as behavioural modification parameters were assessed and monitored with the aid of a questionnaire-interview, progress chart for anthropometric measurements, food and exercise diary and behavioural checklists. The validated questionnaires for Physical Activity (IPAQ 2005) and the nutritional assessment questionnaire (National Integrated Health Associates 2001) were used for initial assessment and the developed behavioural checklists were used as follow up. The behavioural checklists were developed by the researchers and they were validated with a pilot study. They were completed by the candidates on a bi-weekly basis along with the food and exercise diaries. The initial 3-day diet recall (food diary) was analyzed with the use of the Dietary Reference Intake charts and then the food-frequency parts of the checklists will be used for re-evaluation (Otten 2006). The questionnaire reliability (test-retest), internal consistency and ability to differentiate obese/overweight with behaviour modification vs. obese/overweight with no behavioural modification adult behaviours were tested using a pilot population of 50 adults not enrolled in a formal weight loss programme. The questionnaire reliability along with the food and exercise diary and checklists and the predictive validity were tested using a selective population: 158 adults of the observational group enrolled in behavioural modification treatment for diet and physical activity vs. diet. Table 6 presents the material used to assess, evaluate and develop guidelines and protocols for weight management. The differentiation of the developed material and that derived from literature is distinguished. All the

assessment and intervention material are included in the Protocol and Guidelines for weight management 2010.

The WLCB programme took several important external variables into account in the meal planning process, such as taste, cost, preparation difficulty, dietary diversity due to habits or ideology (ie., vegetarian diets), dietary restrictions due to health reasons, nutritional properties, available food items due to seasonality, and religious and cultural factors .

The factors influencing a person's food choice have been studied to a fairly large extent in the science of food and nutrition. Povey (2000) described several attempts to identify factors influencing food choice and to propose the use of the theory of reasoned action as a general model for food choice. However, this model was completely based on user's attitudes, and did not seem suitable as a normative framework. In reflection to this study, the interest was not only in predicting a user's food choice, but to persuade the user of choosing optimal food, weighing in the relevant factors. The WLCB programme required to represent and reason about the following information:

- Dietary restrictions, e.g. ingredients that the user is allergic to, or must not eat for other medical reasons, such as diabetic diet.
- Nutritional values, e.g. amount of fat or protein contained in a recipe, or required by a user.
- Preparation time of a meal.
- Preparation difficulty of a meal.
- Cost of a meal, i.e. the cost of the needed ingredients.
- Availability of ingredients for a meal, e.g. to what extent does the needed ingredients match the ingredients available to the user at home.
- Variation with respect to other meals in the plan, in terms of used ingredients and the category of a meal.
- The user's food taste, i.e. how the user rates a recipe on a taste scale.
- Religious and cultural factors, e.g, Greek orthodox fasting the animal sources before Christmas and Easter

Table 6 - Research Tools

Tools Used from Literature	Tools Developed/ Modified & Used
International Physical Activity Questionnaire (IPAQ, 2005)	Checklist A – Identify your eating habits Checklist B - Identify your Physical Activity Level Checklist C - What Influences Eating Behaviour? Checklist D - What influences the Physical Activity?
Nutritional Assessment Questionnaire (National Integrated Health Associates, 2001)	Progress Chart for Anthropometric Measurements
	Food Diary
	Activity Log
	Guidelines for Behaviour Modification for Eating and Exercise

In the study the intervention group (sample) was educated on the caloric expenditure of common daily tasks, various physical activities, and it was taught how to balance the energy expenditure of their current physical activity regimens and food intake. Individual sessions with the researchers were also offered to assist the group with any physical limitations (i.e.: joint or lower back pain) and with their physical activity goals according to international guidelines (NHANES 2000), although when needed and while physical restrictions were present they were referred to specialists. Moreover, the intervention group was educated on the daily caloric intake and the various behavioural modification techniques in order to control food intake. Both physical activity and food intake were monitored with the use of checklists and a food and activity diary.

RQ = Research Question

Duration

The duration of the study was 36 weeks; 18 weeks for the weight loss and 18 weeks for the implementation of the behavioural modification techniques, for maintenance, follow-up and re-evaluation. The participants met every two weeks and they were reassessed at the end of the 18 and 36 weeks, respectively.

Anthropometry

The body weight of the *obese* was recorded on an electronic scale with a capacity of 300 kg and accurate to 0.1 kg. Height was measured with a wall-mounted stadiometer accurate to 0.5 cm, and the BMI was calculated. Waist circumference was measured with a non-stretch tape measure to the nearest 0.1 cm. The Total Body Fat Percentage (TBFP) was measured with the method of Bioelectrical Impedance Analysis (BIA) which also measured the Basal Metabolic Rate (BMR). Blood pressure (BP) was measured with a standard sphygmomanometer using a wide cuff.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS v 15) was used for statistical analysis. Data were analysed using Student's paired and unpaired *t*-test, chi-square test, ANOVA and simple correlations. Values of $p < 0.05$ were taken to indicate statistical significance. All results are given as mean ± s.d. unless otherwise indicated.

Data obtained at the 3 month review were pooled and the *obese* were categorised into: (i) dropouts—subjects who did not return at 3 months for reassessment were considered to have failed to complete the 3 month programme, (ii) completers—subjects who did return at 3 months for reassessment were considered to have completed the 3 month programme. (iii) WLCB completers—subjects who attended the researchers' offices for reassessment at 1st, 19th weeks were considered to have completed a medium-term programme and those at the 36th a full-term programme.

Upon the selection of the sample, an identification code was appointed to each one along with the registration and treatment electronically in the computational *Statistical Package for Social Sciences* (SPSS 2007). The results from SPSS had undergone a detailed analysis of elements derived from each question. Also, the cross-correlation between the variables (correlations) and the cross tabulations of the questions were examined so that conclusions and tendencies of nutrition and exercise to be derived. The evaluation of eating and exercise habits of obese and excess body weight (overweight) participants is done with the use of anthropometric indicators of

Body Mass Index (BMI), Waist Circumference (WC), and TBFP which are recorded in the progress chart (Appendix N Protocols and Guidelines for weight management 2010), and nutrition and fitness assessment questionnaire (Nutritional & Physical Fitness Assessment Questionnaire in Appendix N of Protocols and Guidelines for weight management 2010). Additional information added to and analyzed from the progress chart were age, gender, height, weight, Fat Free Mass (FFM), Total Body Water (TBW), Basal Metabolic Rate (BMR), Total Energy Input (caloric level of diet), Energy Output, and BP. These indicators were considered as simpler, more functional and more economic methods for use in big number of individuals and action research.

The BMI was calculated by the quotient of body weight in kilos, via the height of body, in metres squared. Individuals with excess weight are considered having BMI from 25 until 29.9 (≈30) kg/m² and above the 20% of Ideal Body Weight (IBW), while obese individuals are considered having BMI above 30 kg/m². The accepted limit of TBFP for men is 14-28% and for women is 15-29% (Williams et al 2000). The body weight was measured with portable scales (Seca) with precision ± 0.1 kg, with the maximum indication of weight being 300 kg. The weighing was done by requiring the individuals to be at fasting stage before breakfast, dressed lightly, without shoes and after emptying the urinary bladder. The recording of weight is performed to the nearest tenth of a kilo. The body height was measured with the individual in a standing position, without shoes, with a height measurement attached at the wall with the legs linked and the arms in by position, in elevation up to the height that is required for the measurements. Height was measured with a wall-mounted stadiometer accurate to 0.5 cm. The recording is made to the nearest tenth of a centimetre. For individuals with kurtosis or who are unable to stand, their height was calculated by the interval of knee-ankle according to the proposed equations for old individuals. The WC was measured with a tape in the level of the smaller region of waist. If there was not waist to the shape, then the measurement was taken at the level of navel, in the end of a regular expiry and it was recorded to the nearest tenth of a centimetre.

It was considered that, men with WC ≥ 94 cm and women with WC ≥ 80 cm present increased risk for metabolic complications, while considerably increased risk present

to men with WC ≥ 102 cm and women with WC ≥ 88 cm. The reliability and the objectivity of BMI were evaluated as excellent and its validity as average. The reliability and the objectivity for the WC were evaluated as very good, and the validity of this method as good. The reliability of measurements is checked with the method of Bioelectrical Impedance (BIA) for the measurement of body fat. The following indexes were available from BIA on the constitution of body: percentage of fat, kilos in fat, percentage and kilos of lean body mass, percentage of water, litres of water, and calories of basal metabolic. It was taken into account and it was assessed individually for the cases where the increased BMI did not correspond to overweight, but to increase muscular mass and to individuals with height smaller than 1.6 metres. Also, in the case of individuals with decreased muscular mass (for example, older men who have normal BMI, while actually be underweight with BMI < 20).

The repetition of the measurements was ensured with written directives to the observers and with experimentation in test sample of individuals. However, the analysis alone couldn't reveal the alimentary sufficiency in someone's daily diet. For this reason, a wide spectrum of a food diary (3-day recall) and two food and nutrition checklists were self reported every two weeks. Statistical analysis was done and compared for the 1st week, 18th week and 36th week. Although the food diary was recorded daily and reported bi-weekly the it was analysed only at the end of the first week and then the information required was taken from the checklists.

Self-efficacy

The International Physical Activity Questionnaire (IPAQ 2005) and the Nutritional Assessment Questionnaire (National Integrated Health Associates 2001) were developed and validated by IPAQ and National Integrated Health Associates. The Nutritional assessment Questionnaire consists of four parts: (i) Demographics and Body Composition Measurements, (ii) Nutrition Questions (Nutrition assessment, lifestyle, medications), (iii) Symptoms in the different body systems and relation to nutrition problems, (iv) diet recall and nutrient frequency (Nutritional Habits, Calorie Control, Dietary Fat, Dietary Salt). All four of these dietary factors have an influence as to whether or not the diet contributes to high of body weight and increased risk factors for leading health problems (heart disease, diabetes, cancer). Each question was answered according to each candidate's usual eating habits. The candidates

placed the number corresponding to their answer in the space provided to the left of each question. The total of these numbers at the end of each category presented the total scoring of the test. The answers were scored and according to the final score, the initial nutrition status of the persons was concluded. The nutritional questionnaire was adjusted to the Cypriot Nutritional Habits according to the validated questioner of the epidemiological Study of Obesity in Cyprus (Andreou et al2005).

The International Physical Activity Questionnaires (IPAQ) comprises a set of 4 questionnaires. Long (5 activity domains asked independently) versions for use by either telephone or self-administered methods are available. The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health–related physical activity. The questionnaires were completed by the two researchers. The questionnaire was scored, prior to the initial appointment.

The total score can be utilized or the scores on the five dimensions can be examined. The five dimensions (factors) are negative emotions, availability, social pressure, physical discomfort and positive activities. Subjects are asked to rate their confidence to successfully resist the desire to eat in each of the different situations presented. There are four items per dimension of self-efficacy, which are scored using a 10-point Likert scale (0–9), with higher scores indicating greater confidence. The range of possible total score for each dimension is 0–36. A total score of 0–180 is obtained by summing the score for each of the five dimensions of efficacy for weight management. The questionnaires can be used as a general screening instrument or to highlight strengths and limitations of the client's cognitive behavioural mechanisms in the regulation of eating.

Behaviour modification intervention programme

At the initial assessment the intervention group of the obese / overweight candidates was offered a 36 month behaviour modification programme which emphasised monitoring dietary fat intake and the frequency of exercise, active problem solving,

stimulus control and cognitive restructuring techniques. The programme comprised six sessions of information on lifestyle issues for weight management. Each session addressed a different topic and contained self-monitoring tasks (including a checklist, food and activity log) and goal setting designed to help in the change of behaviours specifically related to exercise/activity, eating habits and lifestyle. Topics covered by the sessions included getting started / how to start, nutrient content of the nutrition/dietary plan with less fat, more fiber and more starch, movement, activity and exercise, food associations within a physiological, emotional and social framework, positive self-talk and effective problem solving. The programme was offered in three formats and the intervention group followed each type twice:

1. *Self-help (Self)* —this option allowed the candidates to follow the programme at their own pace. Access to telephone counseling was available. The candidates were asked to contact the researchers on completion of each module and the next module of information was then posted.
2. *Supervised by the registered dietitian (RD)*—the candidates were asked to visit their RD (researchers) second weekly for supervision, support and counseling. The RDs had previously undertaken an obesity management training course and they were aware that they could be involved in programme management, which included appropriate diet plan and guidelines for and telephone backup was available from the weight management program. The programme modules, a clinical assessment report and a letter explaining the programme were posted to the candidates.
3. *Group (Group)*—the second weekly structured closed group programme was based on each module but allowed for discussion of issues relevant to each particular group of participants. The dietitians were co-leaders of the programme.

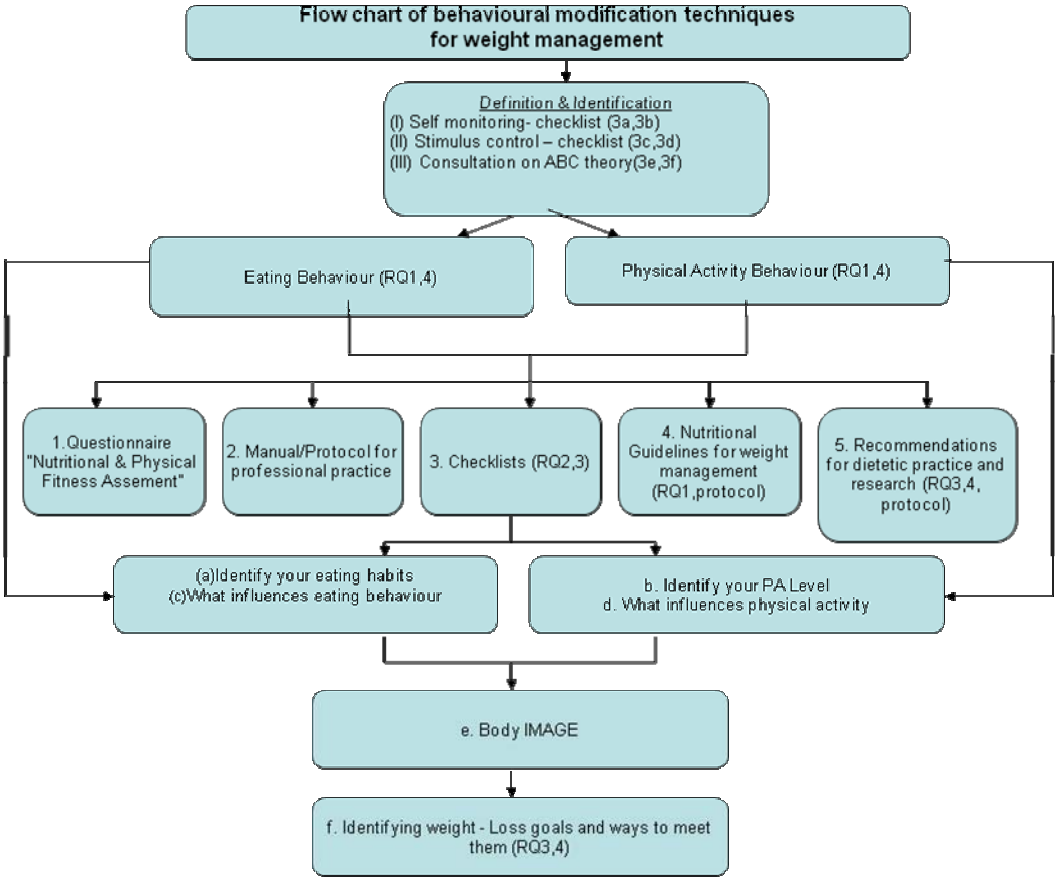
At the conclusion of the initial assessment the candidates were given the first session of information and a lifestyle report, and were shown where improvements could be made to their eating habits. The candidates were advised to follow a reduced fat (≤50g for female and ≤60g for male), high carbohydrate diet. This diet provided approximately 50% of energy from carbohydrate, 30% from fat and 20% from protein. Furthermore, moderate physical activity between 30 and 60 minutes per day

was advised to be followed. This could be accomplished by accumulating several bouts of 10 to 15 minutes of activity. Type of activity and intensity, location, when he or she was going to be active, and for how long were given personalized.

Twenty-to thirty-minute review appointments were organized every two weeks but the complete anthropometric assessment was analyzed for the 1st, 18th and 36th week. All measures undertaken at the assessment and the checklists were repeated at each review appointment. A further four sessions of information (staying on track, reading food labels, modifying recipes and the influence of physical, social and self environmental factors on behaviour) were posted at intervals between 18-36 weeks.

A flow chart (figure 5)of the behavioural modification techniques used for the study is shown below:

Figure 5. Flow chart of behavioural modification techniques for weight management.



Instrumentation

The main instruments that were used in the course of the present study have taken the form of the structured questionnaire with the title "**Nutritional & Physical Fitness Assessment Questionnaire"**

In this joint project, a combination of a questionnaire and an interview was used, as for the purposes of the project the subject's self-report was essential and in order to get all possible provided information by the two observational groups. The recording and evaluation of eating habits of the sample to be studied was possible with the use of the questionnaire of eating and exercise habits, which it was compatible with the Cypriot eating and food and the culture. It was based on:

a. the study of factors that influence generally eating habits,
b. the available elements for the eating habits of Cypriots,
c. the eating factors that contribute in obesity, and
d. the factors that influence the frequency and levels of physical activity and how these are involved in the prevention of obesity and in the maintenance of healthy weight.

The interviews were carried out by the two partners of the study- clinical dietitians- who adjusted the questionnaire to the needs of study and performed the interviews. After the approval of the proposal and even though the two individual parts of the questionnaire (nutritional assessment, physical activity assessment) were validated, **a pilot** trial of the questionnaire was performed to a sample-clientele of 50 people for validation purposes because it was adapted to the circumstances of Cyprus.

Summary of Instrumentation-Data Collection-Data Analysis

Quantitative: Questionnaires (structured), Food & Activity Diary, Anthropometric Measurements, Behavioural Modification –Checklist (structured, observational).

Qualitative: Interviews

Data Analysis

1. SPSS for quantitative
2. Data coding for qualitative
3. Nutritional Analysis and Energy Expenditure

(Food Works- nutrient analysis and energy expenditure software)

Questionnaire /Interview of the study

The questionnaire (Appendix N) was drawn after systematic study of questionnaires that were used in other countries with regards to the eating habits and physical activity.

It was anonymous while a code was appointed to each one of the sample. As far as concerned the administration of the questionnaire it was completed by the researchers through a personal interview that it did not exceed the 45 minutes. The questionnaire was composed of four major categories:

1. General information regarding the individual (sex, age, religion, level of education, family situation).

2. Information regarding the medical background of individual: chronic illnesses, pharmaceutical intake, background of weight and obesity, special diet, use of supplements, smoking, if they have ever visited a dietitian.

3. Questions that aimed in the investigation of the application of the model of the Mediterranean Diet and the degree of divergence or convergence from the adult population of Cyprus and was focused in the following sub-sections:

   a. the frequency and quantity of consumption of food,
   b. the grouping of foods according to the Pyramid of Mediterranean Diet,
   c. the characteristics of the traditional Mediterranean Diet,

4. Information regarding the frequency, the level and duration of physical activity is being evaluated with the following parameters: sedentary, sedentary to moderate, moderate, moderate to high and high.

Furthermore, at the proposed study, checklists of behaviours were developed. These behaviours were monitored through the use of the self developed checklists. The checklists were validated through the pilot study of the 50 sample. The list of the checklists are presented in table 7

Table 7. - Behaviour modification Checklists

Checklist A -Identify your eating habits
Checklist B -Identify your Physical Activity Level
Checklist C- What Influences Eating Behaviour?
Checklist D- What influences the Physical Activity?

Two main categories made up the checklist: the **dietary/ activity changes and** the **lifestyle changes**.

Dietary and activity changes that may be helpful: Societies in which people eat less fat tend to have lower rates of obesity. A low-fat diet is, however, no guarantee of normal body weight (Knopp et al 1997). Sixty percent of the South African population is overweight, despite a comparatively low fat intake (about 22% of calories from fat) (Willett 1998). Foods with a high proportion of calories from fat should be eliminated from the diet or limited; these include red meat, dark poultry meat, poultry skins, fried foods, butter, margarine, cheese, milk (except skim milk), junk foods, and most processed foods. Vegetable oils, nuts, seeds, and avocados should be consumed in moderation, although these foods are healthful for people without weight problems. The diet should instead be based on fruits, vegetables, whole grains, and nonfat dairy products (with low-fat fish for nonvegetarians).

Preliminary research indicates that people who successfully lost weight got less of their total calories from fat and more of them from protein foods. They also ate fewer snacks of low nutritional quality and got more of their calories from “hot meals of good quality” (Anderson et al 2008).

Adequate amounts of dietary fibre are believed to be important for people wishing to lose weight. Fibre contains bulk and tends to produce a sense of fullness, helping people consume fewer calories (Duncan et al 1983). There is conflicting research on

the effect of fibre intake on weight loss, however. Some trials have shown that supplementation with a source of fibre accelerated weight loss in people who were following a low-calorie diet (Marquette 1976) (Rossner et al 1987). Other researchers found, however, that increasing fibre intake had no effect on body weight, even though it resulted in a reduction in food intake (Hylander et al 1983). Different types of dietary fibre are available from a variety of sources, and the recommended amount depends on the type being used. People wishing to use a fibre supplement should consult with a doctor.

Although the relationship between food sensitivities and body weight remains uncertain, according to one researcher, chronic food allergy may lead to overeating and obesity (Randolph 1947).

People who go on and off diets frequently complain that fewer calories result in weight gain with each weight fluctuation. Evidence now clearly demonstrates that the body gets "stingier" in its use of calories after each diet (Muls et al 1995). This means it becomes easier to gain weight and harder to lose it the next time. Dietary changes need to be long term.

Foods containing high amounts of carbohydrate are sometimes measured on a scale called the Glycemic Index (GI). The GI is a numerical value assigned to a particular food based on that food's ability to raise and sustain blood glucose levels, relative to the ability of a glucose beverage to do the same. Eating foods with a high GI (such as white rice, baked potato, corn flakes, white bread) promotes a more rapid return of hunger and increases subsequent intake of calories compared to eating similar foods with a lower GI (such as brown rice, all-bran cereal, oat bran bread) (Roberts 2001). Regular substitution of lower-GI foods, such as whole grains, for higher-GI refined foods may thus help prevent excess weight gain. The decreased physical activity is recognised as a main factor of the increased percentage of obesity while the increased physical activity can contribute in the increase of levels of HDL-Cholesterol and in the reduction of heart diseases (CVD), hyperlipidemia, cerebral episodes, hypertension, and in the development of Diabetes Type II, osteoporosis and certain forms of cancer after it has been determined as factor of danger (Fletcher 1992 & International Obesity Task Force 2005).

Lifestyle changes that may be helpful: Many doctors give overweight patients a pill, a pep talk, and a pamphlet about diet and exercise, but that combination leads only to minor weight loss (Wadden et al 2004). When overweight people attend group sessions aimed at changing eating and exercise patterns, keep daily records of food intake, and exercise and eat a specific low-calorie diet, the outcome is much more successful. Group sessions where participants are given information and help on how to make lifestyle changes appear to improve the chances of losing weight and keeping it off. Such changes may include shopping from a list, storing foods out of sight, keeping portion sizes under control, and avoiding fast-food restaurants.

Exercise has been found to enhance the effectiveness of low-calorie diets (Racette et al 1997). In addition, studies have shown that exercise alone (without dietary restriction) can promote weight loss in obese people (Chaston et al 2008. On the other hand, a review of numerous studies found that the typical regimen of three to five hours per week of exercise generally had little effect on weight loss, and may, in the case of resistance exercise, even increase weight slightly (Votruba et al 2000). Exercise appears to have a more consistent ability to enhance loss of fat tissue, specifically, as well as to preserve non-fat tissue in the body (particularly resistance training, such as weight-lifting). Preliminary research suggests that the most significant contribution by exercise may be in helping to maintain weight loss following a diet (Votruba et al 2000).

People who experience "weight cycling" (*repetitive* weight loss and gain) have a tendency toward binge eating (periods of compulsive overeating, but without the self-induced vomiting seen in bulimia), according to a review of numerous studies focusing on weight loss (National Task Force 2000). The researchers also found an association between weight cycling and depression or poor body image. The most successful weight-loss programmes (in which weight stays off, mood stays even, and no binge eating occurs), appear to use a combination of moderate caloric restriction, moderate exercise, and behaviour modification, including examination and adjustment of eating habits.

Reflecting to the joint project, the main components of the checklist to be used are: self-monitoring, stimulus control, contingency management, changing behaviour

parameters, and cognitive behaviour modification. Table 8 illustrates the components and a description of the behaviour treatment.

Table 8. Behaviour Treatment Components

Component	Description	Examples
Self-monitoring	Recording of target behaviours and factors associated with behaviours	Food and exercise records, moods and environment associated with overeating
Stimulus control	Restricting environmental factors associated with inappropriate behaviours	Keep away from high-fat foods; eat at specific times and places; set aside time and place for exercise
Contingency management	Rewarding appropriate behaviours	Give prizes for achieving exercise goals
Changing behaviour parameters	Directly altering target behaviour topology	Slow down eating; self-regulate exercise
Cognitive-behaviour modification	Changing thinking patterns related to target behaviours	Counter social pressure to be thin to reduce temptation to diet

Source: Foreyt J and Goodrick K. 2004

Interpreting Data

Reliability and Validity

Wiersma (2000) defined *reliability* as the consistency of the instrument in measuring whatever it measures. Reliability refers to the data collection, analysis, and interpretations being consistent in the research process. Reliability of the instrument will be determined by measuring the internal consistency of the instrument using the Cronbach's alpha. Alpha coefficients for the constructs as a whole should be above the 0.70 standard of reliability as suggested by Nunnally and Bernstain (1994). Hence, the internal consistency of the survey instrument will be acceptable and reliable. All reliability analysis will be performed by using the "Statistical Package for the Social Science", (SPSS, 15) for Windows. Reliability and validity, in research, refer specifically to the measurement of data as they will be used to answer the research question. In most case, the instrument that measures the variables is the central issue in determining the reliability and validity of the data; however the data analysis process often is also an issue if the data unstructured.

Whatever data collection method is used, the intent must be accuracy. The reliability of the data collection refers to its consistency, stability, and repeatability-all of which determine the reliability of the results. If it was to measure the same variable in the same subject again, the results should have been the same.

"V*alidity…*tells us whether an item measures or describes what it is supposed to measure or describe. If an item is unreliable, then it must also lack validity, but a reliable item is not necessarily also valid. It could produce the same or similar responses on all occasions, but not be measuring what it is supposed to measure." (Bell 1993). Content validity refers to the logical analysis of the items, determining their representativeness; external validity concerns the extent to which research results are generalisable to populations and/or conditions. Instrument content validity will be established through the inclusion of response items that have previously been reported in the literature and by the choice of items that related directly to the research items being investigated.

For the validation of the questionnaire, it is necessary prior to using it to collect data to be pilot tested. The purpose of the Pilot test is to refine the questionnaire so that respondents will have no problem in answering the questions and there will be no problems in recording the data. In addition, it will enable the researcher to obtain some assessment of the question's validity and the likely reliability of the data that will be collected. Preliminary analysis using the pilot test data can be undertaken to ensure that the data collected will enable the investigative questions to be answered.
The number of people on whom the questionnaire is pilot and the number of pilot tests conducted are dependent on the research question(s), the objectives, and the size of the research project, the time and money resources available, and how well the questionnaire is designed. The numbers of people chosen should be sufficient to include any major variations in the population which affect responses. For most student questionnaires this mean that the minimum number for a pilot is 10 (Fink 1995), although for large surveys between 100 and 200 responses is usual (Dillman 2000). This make possible of the questionnaire *face validity*: that is, whether the questionnaire appears to make sense.
As part of the pilot the researcher checked each completed pilot questionnaire to ensure respondents have had no problems understanding or answering questions and have followed instructions correctly. The responses provided the researcher with an idea of the reliability and suitability of the questions (Bell 1999).
Once the pilot testing was completed the researcher wrote to the respondents thanking them for their help.

Lancaster et al (2004) emphasised the importance of the pilot study by noting that "a well conducted pilot study, giving a clear list of aims and objectives within a formal framework, will encourage methodological rigour, ensure that the work is scientifically valid and publishable.
The external validity of this study was assumed to be reasonably good in that the quality of the sample clientele of two RD of this study were among the best in Cyprus. Moreover, sample participants were randomly selected from the clientele of the dietitians -researchers. Therefore due to the sample's representativeness, the result of the study reasonable can be generalized to the registered dietitians in Cyprus.

Errors in Data Collection Procedures

The main point in doing research is to measure differences among the subjects in the sample. When looking at transportation interventions, it is important to identify whether the intervention really made a difference or if the result was based on some error in the data collection process.

It is essential to identify the true differences that occur as a result of the intervention. These true differences are the research objectives. Any other differences are errors in the measurement process. Some errors may be due to the way data were collected; others, to the characteristics of the subjects.

Errors in the measurement process can be either constant or random. A constant error is one introduced into the measurement by some factor that systematically affects the characteristic being measured or the process of measurement.

On the contrary, random error is due to those transient of aspects of the situation or measurement, or of the measurement procedures that are likely to vary from one act of measurement to the next, even though the characteristic we are trying to measure has not changed. Constant errors affect only validity. Random errors affect both reliability and validity. A final source of error comes not from the process of data collection but, rather, from the process of data analysis.

Validity

There are three major methods of estimating the validity of a data collection instrument. The greater the degree of validity of the data collection device, the more confidence there is that the results achieved reflect true differences in the scores of the sample.

The degree to which valid measurements can be achieved is directly related to the level of the study design. Because most longitudinal studies are observational, in the sense that they observe the state of the world without manipulating it, it has been argued that they may have less power to detect causal relationships than do experiments. But because of the repeated observation at the individual level, they

have more power than cross-sectional observational studies, by virtue of being able to exclude time-invariant unobserved individual differences, and by virtue of observing the temporal order of events.

Just as control over the independent variable must increase with the level of design, so must control for error in data collection. Methods of establishing validity of the measurement technique fall into one of three categories: self-evident measures, pragmatic measures, and construct validity.

Reliability

Reliability refers to the consistency, stability, and repeatability of a data collection instrument. A reliable instrument does not respond to chance factors or environmental conditions; it will have consistent results if repeated overtime or if used by two different investigators. The reliability of an instrument says nothing about its validity. It can be measuring the wrong concept in a consistent, stable fashion. There are three methods of testing the reliability of research instruments:

- tests for the stability of the instruments (how stable it is over time)
- tests for equivalence (consistency of the results by different investigators or similar tests at the same time)
- internal consistency (the measurement of the concept is consistent in all parts of the test).

Each test of reliability looks at a different aspect of the instrument. When developing, adapting, or utilizing someone else's research instrument, there is the need to use one or more of these tests to establish the level of reliability of the instrument for the individual use.

Tests of Stability

A stable research instrument is one that can be repeated on the same individual more than once and achieve the same results. Testing for stability, however, can be done only when there is the assumption that the aspect being measured has remained constant. Repeated observations and test/retest procedures are used to test the

stability of an instrument. Even if there are transient influences present in the situation, it should measure the same way (within a reasonable range) each time the test is given.

Tests of Equivalence

Tests of equivalence attempt to determine if the same results can be obtained using different observers at the same time or if similar tests given at the same time yield the same results.

In observational methods, when the characteristic being observed is expected to change over time, a test of stability cannot be used. The only way to determine if consistent (reliable) results can be obtained is to have two observers using the same instrument at the same time. Their results are compared, and the same results should be expected.

When using a questionnaire, alternate forms of the questions can be used to determine equivalence. Two questionnaires are developed to measure the same content, the questions are interspersed, and the double questionnaire is administered to the same subjects simultaneously. Then, the questionnaires are separated for analysis, and the results are correlated the same way as a test/retest would be.

Test of Internal Consistency

Internal consistency refers to the extent to which all parts of the measurement technique are measuring the same concept. For example, when developing a questionnaire to measure depression of air traffic controllers, each question should provide a measure of depression consistent with the overall results of the test.

To test the internal consistency of a questionnaire, the split-half method is often used. In this method, a questionnaire is divided in half by some random method, and the two halves are correlated. If they consistently measure the same concept, a high correlation will be obtained.

To determine the reliability of the laboratory doing the tests, two parts of the same specimen can be sent separately to the same laboratory for analysis. The results can then be compared for consistency.

Data Collection

The procedures used for collecting data were with the use of a structured questionnaire along with the initial interview administered to the 315 randomly selected clientele of the two researchers by the same researchers. The purpose of the questionnaire for nutritional assessment although gave information of the medical background of the sample.

Checklist were given at the 1st week, 19th week and the 36th week

Progress chart – fill in every two (2) weeks by the researchers. The progress chart (Appendix N) contains the following info: respondent survey mailed out to a specific representative sample.

Ethics in designing, conducting, and analyzing research

Confidentiality of medical and personal information is a pillar of scientific ethics. Participants agree, through the informed consent process, to have specific clinical, psychological, or physiological data collected. Researchers must manage the data in a manner that maintains subject anonymity. Once the data has been collected, the "contract" of informed consent is concluded, and further testing or analysis of samples is prohibited. After a specified period of time to allow for final data analysis, samples should be destroyed. Only when additional consent can be, and is, obtained may further analysis be done. Any records involving identity of subjects must be maintained securely, with restricted access (Monsen 2003).

Whereas using "banked samples" for new analysis may be of scientific interest, there can be no assumption of consent. Moreover, "blanket consent" is not ethical. A participant cannot agree to tests and analyses not in the original consent agreement. For example, some analyses may be developed after the research has been designed and approved; it is conceivable that subsequent analyses not governed by the consent

agreement could bring to light medical conditions that could have a major impact on subjects' lives, as in influencing insurance, medical, and employment decisions.

The scientific method is the basis for research design. Initially, the existing body of scientific knowledge is carefully assessed. Questions important to science and society are formulated, and in response to the research questions a vigorous and rigorous research design is crafted. Ethical scientific conduct includes accurate recording of data in such a way that they are readily available and understandable to current and future colleagues. To ensure appropriate data accessibility, the data need to be recorded at the time they are generated both correctly and in the detail necessary for ready comprehensions. Original data books need to be carefully secured and retained, and they must be made available if requested. Subject anonymity must be maintained as well.

Throughout the research process, careful attention needs to be paid to details of subject selection, method choice, and execution. If critical details are disregarded and if sloppy science is allowed, ethical predicaments may, and indeed usually do, develop.

Dillman (2000), who is recognized for his research on survey methodology, outlined four potential research errors that invalidate research: sampling error, noncoverage error, nonresponse error, and measurement error. The impact of such errors extends beyond survey design to other descriptive research techniques and to analytic research as well. By minimizing and, it is hoped, eliminating these sources of error, research will be substantially more useful.

Triangulation: Potential influences on the data analysis can be overcome by using different techniques (i.e. interview, questionnaire, checklist, and diary) for the purposes of the data analysis limit the possibility to influence the outcome. The methodology of the proposed project will be based on a triangulation framework. This framework is the preferred line in social sciences since it helps to overcome the limitations of intrinsic biases. The adoption of triangulation is thus significant in

conceptualizing a theoretically complex phenomenon such as behavioural modification in weight management.

Data Analysis

The frequency analysis will be performed to provide demographic profiles of the sample. Inferential statistics will be employed to answer Research Question 1 through 4 (summary of the research questions are presented in table 9).

To generate responses from Question 1 to Question 4, the use of inferential statistics will include *t* tests, analyses of variances (ANOVAs), pearson chi square, paired t-test, correlation analysis, and linear regressions. All significant ANOVAs will be followed by Tukey's Honesty Significant Difference (HSD) post-hoc test to determine which demographic groups differed significantly from the others. The .05 level of significance will be used for all t tests, ANOVAs, correlation analysis, and linear regression analyses. All descriptive and inferential analyses will be performed using the "Statistical Package for the Social Sciences" (SPSS v.15, 17). The most appropriate data analysis techniques will be fully utilised.

Analyses

Several analyses can be used during the initial data analysis phase (Adèr H.J. 2008).

- Bivariate associations (correlations)
- Graphical techniques (scatter plots)

It is important to take the measurement levels of the variables into account for the analyses, as special statistical techniques are available for each level:

- Nominal and ordinal variables
    - Frequency counts (numbers and percentages)
    - Associations
        - circumambulations (crosstabulations)
    - Exact tests or bootstrapping (in case subgroups are small)
    - Computation of new variables

- Continuous variables
    - Distribution
        - Descriptive Statistics (M, SD, variance)

Table 9. Research Questions:

1. How can we measure specific Eating Habits and Physical Activity through the use of Behaviour Modification techniques to promote an Active Lifestyle and sound Nutritional Habits for overweight/obese adults?

2. Is behavioural modification for eating habits and exercise an effective way to treat obesity/overweight in terms of weight loss and maintenance?

3. Does the weight loss that results from a behaviour modification in combination with exercising and dieting outweigh or not outweigh the weight loss from dieting?

4. Is there a link between behaviour modification along with nutrition and exercise intervention and maintenance of the weight lost?

Reflection

Both of us as researchers involved in this study consider that Research and Development for Professional Practice is the foundation of the DProf Programme. It enables us to implement our knowledge of the research topic and our higher understanding of research methodology and epistemology for contacting this behaviour modification study. It is apparent that strong background of the epistemology and methodology including the ethical considerations were essential for a reliable and validate study.

THE USE AND EFFECTIVENESS OF BEHAVIOURAL MODIFICATION TECHNIQUES IN ACHIEVING AND MAINTAINING NORMAL WEIGHT AND FITNESS – THE LIFESTYLE CHANGES FOR ADULTS IN CYPRUS

A PROJECT SUBMITTED TO MIDDLESEX UNIVERSITY
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF
PROFESSIONAL STUDIES

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PART I (B)

APRIL, 2011

The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight And Fitness – The Lifestyle Changes for Adults in Cyprus

A project submitted to Middlesex University in partial fulfillment of the requirements for the degree of Doctor of Professional Studies

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April, 2011

CHAPTER 4

PROJECT ACTIVITIES & FINDINGS ANALYSIS & DISCUSSION OF THE RESULTS

This chapter presents the different activities in sequence that took place in order for this project to be materialized. In addition, it concludes with the presentation and analysis of the results of the study.

Project Activities

A sample of 315 individuals was selected with the method of stratified random sampling with proportional percentage of women (51.5%) and men (48.5%). This was calculated by a statistician based on the information given for obesity percentage in Cyprus of 19% for men and 21% for women (WHO 1991) and the Cyprus population for 2001. The figures of obesity were the most valid at the time of the beginning of this study as those were adopted by the Cyprus Ministry of Health. For the sample of this size the statistical error is 5.5%. Given this information the obese population in Cyprus is 70.000 (average 20%). The sample was representative from all main cities and suburbs in Cyprus (Nicosia, Limassol, Pafos, Larnaca and Famagusta). The Demographic Report of 2006 (Cyprus Statistical Services 2007) was used in order to have an accurate number from each city. The sample as already stated were the clients from the clientele of the two researchers of the study who are registered dietitians (RD) and they were selected by stratified random sampling by gender as proportional percentage of the gender of the general population in Cyprus.

The age group to be investigated was 19-50 years according to Dietary Reference Intakes (DRI) age distribution for adults (Otten 2006) and the BMI levels of overweight/obesity (CyDA 2005). The *Dietary Reference Intake* is a system of nutrition recommendations from the Institute of Medicine (IOM) of the USA National Academy. The DRI system is used by both the United States and Europe. It is intended for the general public and health professionals (Otten 2006).

Facts of the study:

1. Sample - The sample was from the two researcher's clientele with the assumption that the clients were a representative group of the people visiting any Registered Dietitian in Cyprus and derived from the fact that this a work based program.
2. Uniformity of the sample (treatment plan, sample criteria) - The use of the clientele sample of the two researchers ensured uniformity of the sample as far as concern the treatment and avoidance of the problem of drop out.
3. A standard clientele for a dietitian was the one who received a diet plan or any nutritional guideline for a specific nutritional problem (i.e. weight management). In the specific study this was represented by the control group.
4. Developed/ modified questionnaire, checklists, food diary & activity log, progress chart and validated through pilot study of fifty people.
5. Consent form- Before participating at the study all the sample members were required to sign consent form.

Two major observational groups:

- Control Group (Group 1) – this group followed a diet-controlled (calorie restricted) programme and was common to both researchers.
- Intervention Group (Group 2) – this group followed the same dietary guidelines as the Control Group. In addition, it followed the suggested behavioural techniques regarding food and eating habits (done by Eleni Andreou) and exercise (done by Christiana Philippou).

The sample size of the control and intervention group (1:1) was 315 for the most reliable results. However, due to the fact that a 10% non-respond rate was assumed, a sample of 350 individuals was selected in order to receive a sample of 315. It has to be noted that for some questions in the questionnaires 337 answers were received which this decreased even further the error while at the same time there was no significant change among the 315 and 337 responses. Table 1 shows the inclusion criteria.

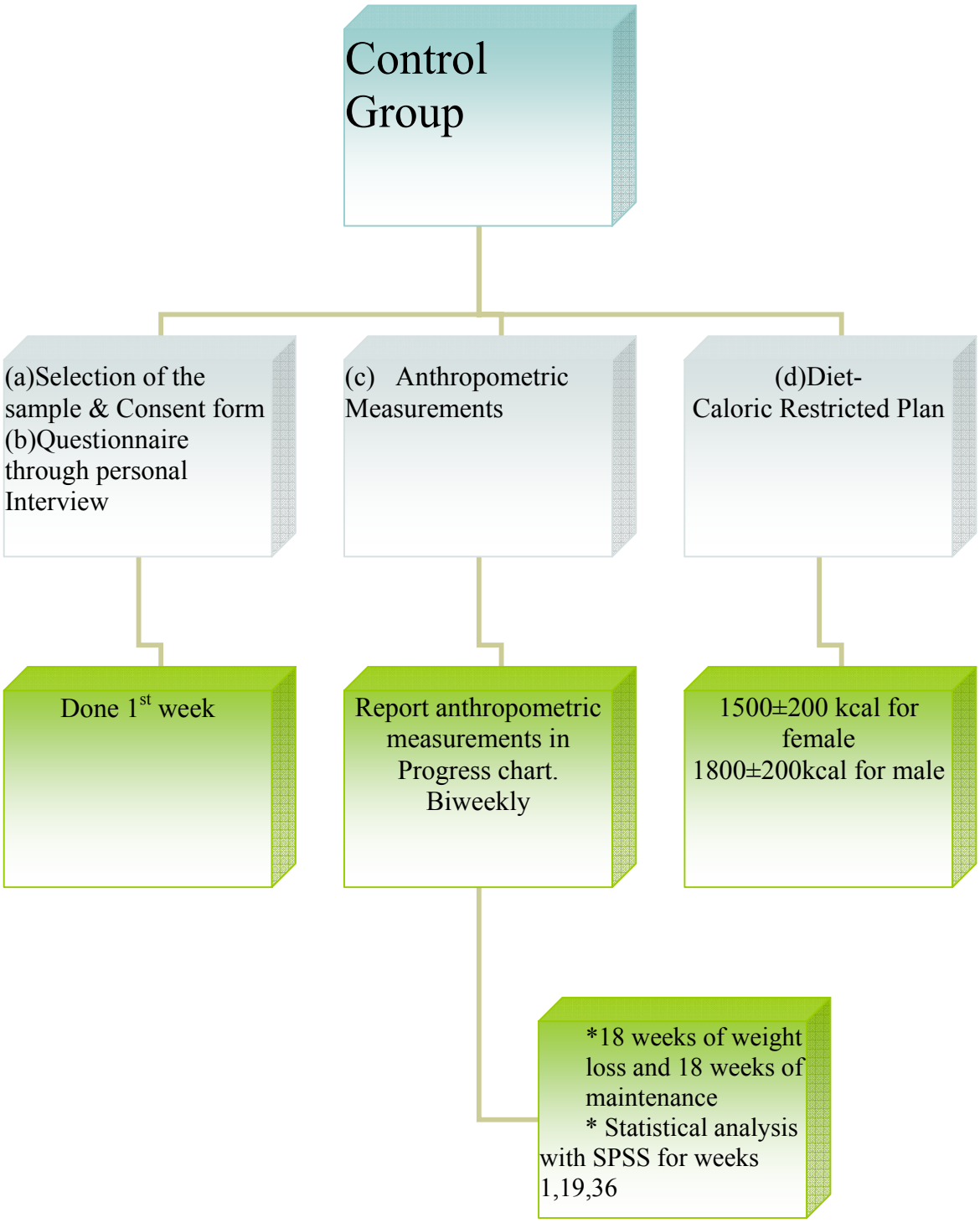
Table 1. Inclusion Criteria

	Control Group	**Intervention Group**
Number of subjects	157	158
Age*	18-50yrs	18-50yrs
Weight	Ideal Body Weight +15-20% (IBW)	Ideal Body Weight +15-20% (IBW)
Body Mass Index	>25	>25
Waist Circumference	>94cm for men >80 cm for women	>94cm for men >80 cm for women

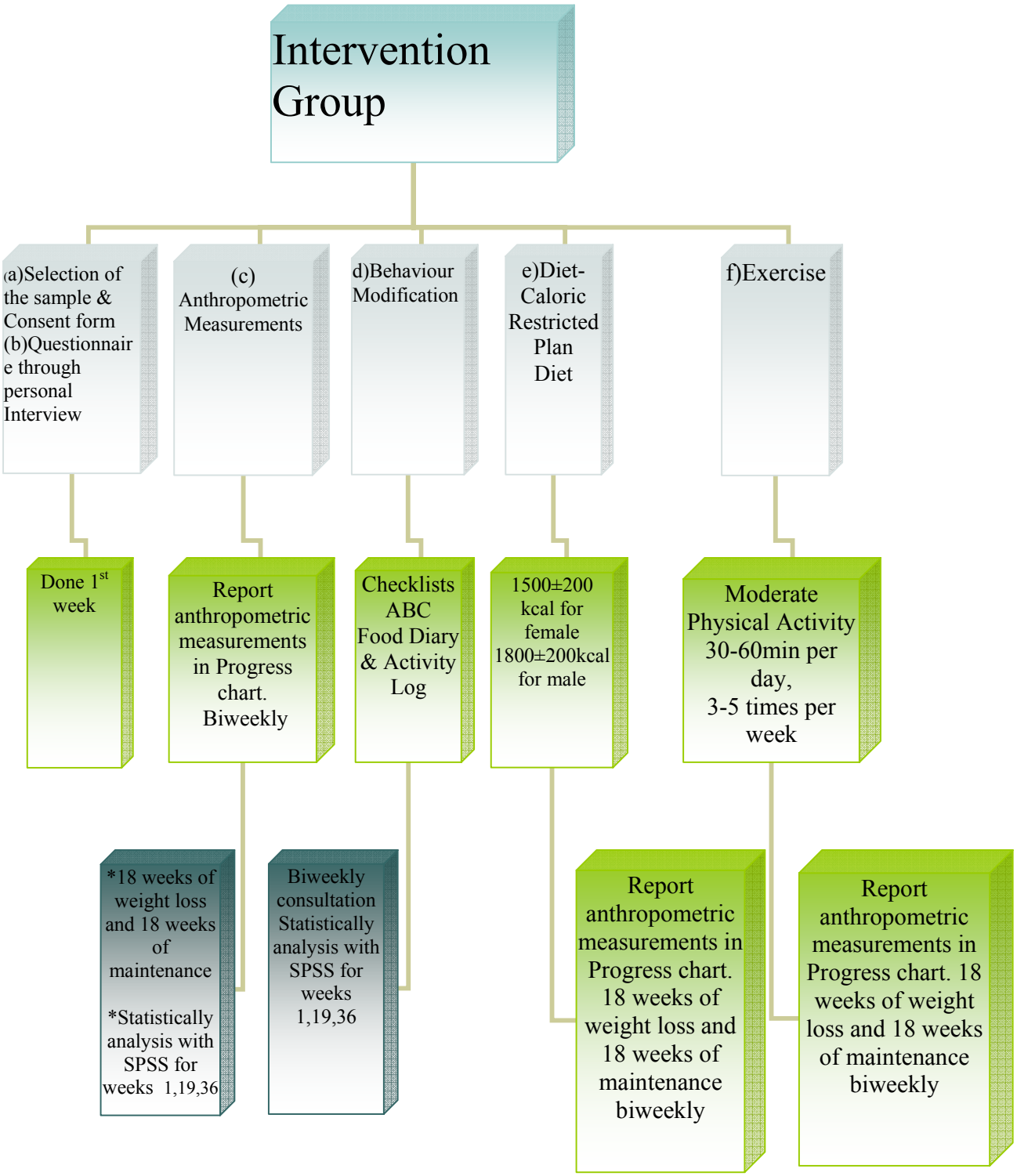
*Legal age; based on the DRI-Dietary Refernce Intake Levels of BMI

The following diagrams show in summary the activities for each group. (Diagram 1 & Diagram 2).

Diagrams 1 – Summary of activities for Control Group



Diagrams 2 – Summary of activities for Intervention Group



The population distribution of the sample is presented in the Appendix 2.

Hypotheses were generated during data collection and analysis, and measurement tends to be subjective. In the qualitative paradigm, the researchers became the instrument of data collection, and results might vary greatly depending upon who conducted the research.

After the subjects were selected, they were applied a code, registered and treated electronically in the computational *Statistical Package for Social Sciences* (SPSS v.15-17). The results from SPSS had undergone a detail analysis of elements that derived from each question. Also, the cross-correlation between the variables (correlations) and the cross tabulations of the questions were examined so that the conclusions and the tendencies for nutrition and exercise were derived. The evaluation of eating and exercise habits of obese and excess body weight (overweight) samples were done with the use of anthropometric indicators of Body Mass Index (BMI), Waist Circumference (WC), and Total Body Fat Percentage (TBFP), and nutrition and fitness assessment questionnaire. These indicators were considered as simpler, more functional and more economic methods for use in big number of individuals and action research.

Qualitative research methodologies were designed to provide the researchers with the perspective of target audience members through immersion in a culture or situation and direct interaction with the people under study. In this study, the target audience were (equally divided in number by both partners while observed as a whole by both of them) the overweight/obese Cypriot clientele ranking in the age group of 19 to 50 of age.

The advantage of using qualitative methods was that they generated rich, detailed data that left the participants' perspectives intact and provided a context for health behaviour. The focus upon processes and "reasons why" differs from that of quantitative research, which addresses correlations between variables. A disadvantage was that data collection and analysis was labored intensive and time-consuming.

The BMI was calculated by the quotient of body weight in kilos, via the height of body, in meters raised in the square. Individuals with excess weight were considered having BMI from 25 until 29.9 Kg/m² and above the 20% of Ideal Body Weight (IBW), while obese individuals were considered having BMI above 30 Kg/m². The accepted limit of TBFP for men is 14-28% and for women is 15-29% (Williams et al 2003). The body weight was measured with portable scales (Seca) with precision ±0.1 Kg, with the maximum indication of weight being 200Kg. The weighing was done by requiring the individuals to be at fasting stage before the breakfast, dressed lightly, without shoes and after emptying the urinary bladder. The recording of weight became in the nearest tenth of the kilo. The height of body was measured with the individual being in standing position, without shoes, with a height measurement attached at the wall. The recording became in the nearest tenth of centimeter. For individuals with kurtosis or cannot stand, their height was calculated by the interval of knee-ankle according to the proposed equations for the old individuals. The WC was measured with a tape in the level of the smaller region of waist. If there was not waist to the shape, then the measurement was taken in the level of navel, in the end of a regular expiry and it was recorded in the nearest tenth of the centimeter. The measurement of height was taken while the individual standing with the legs linked and the arms in by position, in elevation up to the height that is required for the measurements.

It was considered that, men with WC ≥94cm and women with WC ≥80cm present increased risk for metabolic complications, while considerably increased risk present to men with WC ≥102cm and women with WC ≥88cm. The reliability and the objectivity of BMI were evaluated as excellent and its validity as average. The reliability and the objectivity for the WC were evaluated as very good, and the validity of this method as good. The reliability of measurements was checked with the measurement with the method of Bioelectrical Impedance (BIA) for the measurement of body fat. The following results were available from BIA on the constitution of body: percentage of fat, kilos in fat, percentage and kilos of lean body mass, percentage of water, liters of water, and calories of basal metabolic.

The repetition of the measurements ensured with written directives to the observers and with experimentation in test sample of individuals.

Duration -Sampling-Specifications

The control group followed a caloric restricted programme for 18 weeks, and the maintenance for 18 weeks. The participants of the control group met at the 1st week and the 18th week for the maintenance. They were assessed/ reassessed in weeks 1, 19, 36.

The time duration of the study for the intervention group was also 36 weeks; 18weeks for the weight loss through a caloric restricted programme companied with a behaviour modification techniques for eating and exercise. Then, it followed another 18 weeks for implementation of the behavioural modification techniques, for maintenance, follow-up and re-evaluation. The participants of the intervention group met every two weeks with the researchers for consultation and they were assessed/ reassessed in weeks 1, 19, 36.

Both of the groups received an energy-restricted diet (1500 ± 200 kcal/day for women, 1800 ± 200 kcal/day for men) for one week cycle. Specific dietary and activity guidelines were given involving a moderate intensity activity level such as walking for 30-45 minutes and behaviour modification consultation only to the intervention group. The initial consultation session as well as the group sessions lasted one hour and the follow up sessions 20-30 minutes each (for the intervention group only).

Behavioural Modification Techniques

ABC Method

The intervention group was consulted/ instructed either at the individual sessions or the group sessions how to use the Functional Behavioural Assessment Methods – ABC (Antecedents- Behaviour- Consequences). As described in chapter 3, there were used four checklists in order to guide and assess its behaviour regarding eating and exercise. Table1 presents examples of Functional Behavioural Assessment Method- ABC based on the checklists of the study.

Examples of Functional Behavioural Assessment Method: ABC

	Antecedents	**Behaviour**	**Consequences**
Checklist A – Identify your eating habits	Eat a lot of meat in high quantities daily and does not consider legumes as a meal. Eat the meat with french fries and no vegetables	Eat legumes in salads mixed with fish and a favorite oil based sauce in a controlled quantity	Eat less saturated fat an less calories
Checklist B - Identify your Physical Activity Level	Live a sedentary life with no exercise	Take the stairs at work and walk to the convenience store daily to buy newspaper	Increase the energy expenditure (calories burned through exercise)
Checklist C - What Influences Eating Behaviour?	Dinning out 3 times per week at 'tavern' style restaurant	Dinning out 3 times a week, order a la carte and use the food plate model	Decrease the caloric intake
Checklist D - What influences the Physical Activity?	Too hot to exercise out and not cost effective to go to the gym	Use a dvd with different exercises and do them at home with the air-condition on	Increase the energy expenditure
Overall Consequence	Unsound behaviour towards eating habits and exercise	Modified Behaviour regarding eating habits and exercise	Weight loss and long lasting maintenance

Behaviour modification techniques include self-monitoring, stimulus control, cognitive restructuring, stress management and social support (Berke 2000). For the purposes of the behaviour strategies presented in this project, there was a concentration only on the modification of eating habits and exercising. Table 2 is a very analytical table demonstrating the behaviour therapy sessions followed at the individual/ group sessions, the activities reinforcing them and the tools developed, modified from the literature and used for their implementation. It should be noted that all the tools will be included in the *Protocol and Guidelines for professional users for weight management for Adults* developed specifically as an outcome of this project.

Table 2. Summary of Behaviour Therapy Techniques and Tools for Weight Management

Behavioural Therapy Sessions/Project Actions		**Tools developed/modified and used[1]**
1. Getting Started	Presents an outline of behavioural approach. Prescribes a ½ - 1 kg/week weight loss goal and an individual diet plan and goal to achieve this weight loss.	1. Nutritional & Physical Fitness Assessment Questionnaire: 2. A brief Behavioural Assessment 3. Ready or Not Estimating Weight Loss (i.e set realistic goals) 4. Appendix J. Goal Setting and Recording for Weight Management 5. Progress Chart for Anthropometric Measurements
2. Self-Monitoring	Teaches the value of recording immediately and, directly. Helps	1. Food and Exercise Diaries (every visit) 2. Checklists (week 1, 18 and 36):

	WLCBs[2] learn to find calorie values by using a reference book and reading food labels.	Checklist A – Identify your eating habits Checklist B - Identify your Physical Activity Level Checklist C - What Influences Eating Behaviour? Checklist D - What influences the Physical Activity? 3. Appendix B. Shopping- Food Labeling- Traffic Lights 4. Appendix L. Glycemic Index
3. Modifying Diet	Stresses the importance of restricting dietary fat intake. Teaches common sources of dietary fat and strategies to lower fat.	1. Appendix C. Nutrient and Calorie Modifications 2. Appendix D. Food Exchange List 3. Appendix E. Menus with Lower Calories 4. Appendix F. Cooking Can be Healthy and Tasty 5. Checklist A and C
4. Increasing Physical Activity	Introduces the importance of physical activity for energy balance and prescribes activity goals that gradually increase over the course of the programme.	1. Appendix H. The Physical Activity Guidelines 2. Checklist B and D

5. Stimulus Control	Teaches WLCBs to remove cues for wrong behaviours and increase cues for appropriate behaviours.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercising
6. Changing the Act of Eating	Emphasizes the significance of eating slowly, eating in designated locations, and eating a variety of different foods. Often integrates discussion of dinning out and the food guide pyramid and the food plate.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercising 2. Appendix G. Dinning Out—Use of the Food Plate Model.
7. Problem Solving	Educates WLCBs to identify problem areas or barriers related to eating or exercise, to brainstorm solutions to their problems, and then select one to implement.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercising
8. Social Support	Helps WLCBs to learn to ask others for the type of support	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercise

	they need to change their behaviours.	
9. Restaurant Eating	Demonstrates tactics for managing eating away from home.	1. Appendix G. Dinning Out—Use of the Food Plate Model.
10. Changing Cognitions	Teaches WLCBs to distinguish their negative thoughts and counter them with positive re-framing. Positive and negative reinforcement.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercising 2. ABC Method
11. Managing Stress	Assist WLCBs learn to recognize sources of stress in their lives, examine the association between stress and eating, and develop new strategies for dealing with stress.	2. Appendix H. The Physical Activity Guidelines 3. Appendix I. Behaviour Modification Guidelines For Eating and Exercise 4. Appendix J. Goal Setting and Recording for Weight Management 5. Appendix K. Food and Physical Activity Diary
12. Motivational	Guide WLCBs how to develop motivational strategies to help them maintain their habit changes long-term.	Appendix N. Progress Chart Lifestyle, Diet, and Physical Activity Appendix K. Food and Physical Activity Diary

13. Relapse Prevention	Educate WLCBs to recognize high risk situations, plan for these situations, and to keep lapses from leading to relapse.	Appendix I. Behaviour Modification Guidelines For Eating and Exercising

[1] All tools are included in the Protocol and Guidelines for Weight Management
[2] WLCB - Weight Loss Candidate with Behaviour Modification

Findings, Analysis and Discussion of the Results

The following sections of this chapter present the analyzed data gathered from the research. This study sought to determine whether behaviour modification techniques are effective means to achieve and maintain weight loss. The data in the following sections will show whether to accept or negate the hypothesis: *Research shows that the behavioural modification techniques represent the most effective way to achieve and maintain weight loss comparing to diet alone. If the candidates (Weight Loss Candidate with Behaviour Modification-WLCB) used the specific behavioural modification techniques regarding eating and physical activity, then at least two thirds of them would achieve a weight loss of average ½ -1kg per week for the 18 weeks of the treatment and then maintain it or continue to lose after treatment termination with a total treatment period of 36 weeks efficiently and long-lasting compared to the control candidates who followed a diet plan only.*

QUESTIONNAIRE

The **Nutritional assessment Questionnaire** consisted of four parts:

(i) Demographics and Anthropometric/Body Composition Measurements and Blood Pressure ,
(ii) Nutrition Questions (Nutrition assessment, lifestyle, medications),
(iii) Symptoms in the different body systems and relation to nutrition problems,
(iv) Diet recall and nutrient frequency (Nutritional Habits, Calorie Control, Dietary Fat, and Dietary Salt).

The questionnaire was completed through a personal interview of the two researchers. Each WLC (Weight loss Candidate) had signed a consent form before participating at the study. All four of these dietary factors have an influence as to whether or not the diet contributes to high body weight and increase risk factors for leading health problems (heart disease, diabetes, cancer). Each question was answered according to each candidate's usual eating habits. The candidates placed the number corresponding to their answer in the space provided to the left of each question. The total of these numbers at

the end of each category presented the total scoring of the test. The answers were scored and according to the final score, the initial nutrition status of each person's was concluded.

The demographic characteristics of the participants such as gender, age, place of residence, age, educational attainment, marital and employment status, were derived from the analysis of the questionnaire which was administered by the dietitians to all 337 participants of the study. All the results of the questionnaire are included in Appendix 3.

(i) Demographics and Anthropometric/ Body Composition Measurements and Blood Pressure

Demographics

1. Population distribution and Age

The sample was from the five towns of rural and urban areas, with a final total sample size of 337 people. It had similar demographic characteristics and included overweight/obese clientele ranking in age from 18 to 50 year.

Table 3. Population Distribution

	MEN (%)	WOMEN (%)	TOTAL (%)
NICOSIA (rural &urban)	40	41	40.7
LIMASSOL (rural &urban)	28	28	27.9
LARNACA (rural &urban)	17	17	16.6
PAPHOS (rural &urban)	8	9	8.9
FAMAGUSTA (urban)	6	6	5.9
			100

The 40.7% of both men and women were from Nicosia which represented the highest percentage from the five main cities in Cyprus (except Kerynia) (see **table 3**). As far as the distribution is concerned between men and women, 39% derived from men and 61% from women. The population distribution of the sample presented is compliant with the population status of the Cyprus Population Statistic Services (CySS 2007). The population distribution of the study is presented in Appendix 2.

Table 4 shows a summary table for each type of demographic data derived from the questionnaire.

Table 4. Summary table for each type of demographic data

		Column N %
Occupation	Agriculture	,0%
	Industry	1,7%
	Mental Involvement/Office Work	53,0%
	Student	24,8%
	Housewife	4,3%
	Retired	,0%
	Unemployed	2,0%
	Other	14,2%
	Total	100,0%
Total number of years of education	up to 10	19,5%
	11-12	16,5%
	13-14	17,5%
	15-16	13,8%
	17-18	20,5%
	more than 18	12,1%
	Total	100,0%
Family Status	Married	58,6%
	Divorced	6,7%
	Single	32,0%
	Widow	2,7%
	Total	100,0%
Number of people living in the same houshold with you	up to 2	18,3%
	3-4	63,7%
	5-6	12,9%
	more than 6	5,0%
	Total	100,0%

The majority of the sample held an office position (53%), the 2nd rank was students at a college/university level (24.8%) while a low percentage was derived from the industrial sector (1.7%).

The numbers of years of education included elementary, high school, undergraduate and graduate level of university. Although, the years of education for the sample had a broad

range, the highest percentage was 20.5% for the range of 17-21 years of education (university education at graduate level) with the next highest the 17.5% for the range 13-14 years.

The 58.6% of the sample was married and the 32% was single while at the same time 63.7% had 3-4 people living with them in the house. In fact, up to 81.6% (cumulative results) had three people living in the same household with them.

Blood Pressure and Body Composition.

Blood Pressure Measurement

Table 5a. Blood Pressure according to Gender

Gender		MEN	Evaluation	WOMEN	Evaluation
BP(systolic)	Mean	120.02	P	116.88	N
	SD	11.84	N-P	10.69	N-P
BP (diastolic)	Mean	80.38	P	77.26	N
	SD	9.60	N-P	10.41	N-P

N- Normal Blood Pressure
P- Prehypertension

The blood pressure measurements of the respondents were carried out and were grouped according to gender, age and rural area. Males had an average blood pressure of 120.02/80.38 (SD ± 11.84/9.6) which is the optimal range of the normal BP range (Appel 2006; Wolz 2000; NHLBI 2010). The women had lower mean blood pressure rate at the range of 116.88/77.26 (SD ± 10.69/10.41) which it was still within the normal range with the positive value of the standard deviation. The actual results are presented at **table 5a**.

The table below gives the criteria for normal and high blood pressures (ibid).

Categories		Systolic BP in mmHg		Diastolic BP in mmHg
Normal Blood Pressure		<120	AND	<80
Prehypertension		120 - 139	OR	80 – 89
High Blood Pressure	**Stage 1 Hypertension**	140 - 159	OR	90 – 99
	Stage 2 Hypertension	160 and Above	OR	100 and Above

To understand how to interpret a high blood pressure reading, the following points should be noted (ibid):

1. Wherever there is an "AND" it means that the two conditions MUST be met to qualify. E.g. for anyone to have normal blood pressure, BOTH the diastolic and systolic blood pressures must be below the specified values of 120 mm Hg and 80 mm Hg respectively. Therefore 115/75 mm Hg is normal BUT 145/75 mm Hg is not normal because the Systolic BP is high. Also 115/95 mm Hg is not normal because the diastolic BP is high.
2. If there is an "OR" it means that whenever one value meets the conditions, then it can fall into that category. E.g. 130/75 is prehypertension because 130 fall in that category. This is true even though the diastolic BP doesn't fall in that category.
3. If the Systolic BP and the Diastolic BP fall into two different categories, then the one that falls into the more severe category determines the class. E.g. A high blood pressure reading of 145/75 mmHg will be stage 1 hypertension in spite of the fact that the diastolic BP (75mmHg) qualifies as normal. This is because the systolic BP of 145mmHg falls into stage 1. In the same vein, 140/105 mmHg will be stage 2 and not stage 1 because the diastolic falls into stage 2.

Table 5b. Blood Pressure (BP) according to Age

		18-24	25-29	30-34	35-39	40-44	45-50
BP (systolic)	Mean	109,4	116,3	111,5	116,0	115,9	117,2
	SD	10,74	11,45	9,92	9,90	11,21	15,73
BP (diastolic)	Mean	75,75	76,13	76,99	77,96	77,86	79,35
	SD	10,89	7,11	10,19	7,86	9,52	10,56

Grouped according to age, for all age groups the systolic pressure measurements were below 120 mm Hg and the diastolic pressure measurements were below 80 mm Hg (see **table 5b**). Therefore, both systolic and diastolic BP was within normal ranges. The lowest BP was demonstrated by the age group 18-24 and it was 109.4/75.75 (SD ± 10.74/10.89) and the highest by the age group 45-50 with a blood pressure 117.2/70.35 (SD ± 15.73/10.56).

Table 5c. Blood Pressure (BP) according to RURAL AREA

		NICOSIA	LIMASSOL	LARNACA	PAFOS	FAMAGUSTA
BP(systolic)	Mean	116,22	119,74	117,09	120,14	-
	SD	15,11	13,35	11,87	12,07	-
BP (diastolic)	Mean	77,84	78,92	82,80	80,20	-
	SD	12,14	8,62	10,58	7,43	-

Grouped according to rural area, the BP for those in Nicosia and Limassol were within normal ranges based on their means. As for the BP for those in Larnaca and Pafos fell within prehypertension ((ibid) as per the higher than normal diastolic BP (82,10± 10,58, 80, 20± 7.43, respectively) (**table 5c**).

Table 5d. Blood Pressure (BP) according to URBAN AREA

		NICOSIA	LIMASSOL	LARNACA	PAFOS	FAMA-GUSTA
BP (systolic)	Mean	116,20	120,43	127,23	114,98	118,02
	SD	10,59	10,89	10,80	19,88	15,01
BP (diastolic)	Mean	77,28	78,65	76,22	82,20	78,64
	SD	7,37	8,83	8,03	10,64	11,19

Grouped according to urban area, the BP for those in Nicosia and Famagusta fell within normal ranges based to their means and the SD. Regarding the BP for those in Limassol and Larnaca fell within prehypertension (ibid) because of the higher than normal systolic BP (120,43 ± 10,89, 127,23± 10,80 respectively). Moreover, Pafos fell within prehypertension because of the diastolic measurements (82, 20 ± 10, 64) (table 5d).

Height Measurement

Table 6. Height (cm)

	N	Mean	Std. Deviation	Median	Min.	Max.
Male	131	174.77	6.421	175	153	195
Female	206	161.43	5.336	161	148	176

The mean height of the male respondents was 174 cm with a SD ± 6,421 while the mean height for females was 161 cm with a SD ± 5.336. The minimum height recorded for the males was 153 cm while for the females the minimum recorded height was 148 cm. The maximum height recorded for the males was 195 cm while for the females it was 176 cm (**table 6**).

Body Composition

Table 7a. Initial characteristics of both groups

	Baseline		
	Control (n = 145)	**Intervention (n = 192)**	**t-test p-value)**
Sex (m/f)	(50/95)	(81/111)	0.056
Age (y)	35±16	35±16	0.754
Weight	86.8 ± 15.41	85.6 ± 16.6	0.053
WC	100.75 ± 14.6	90.02 ± 13.9	0.086
BF (%)	40.32 ± 8.57	39.05 ± 7.3	0.059
BF (kg)	34.20 ± 6.60	33.32 ± 6.44	0.344
LBM (%)	59.67 ± 8.57	60.9 ± 7.3	0.378
TBW (%)	37.34 ± 4.63	40.3 ± 2.1	0.834
BMR (Kcal)	1722 ± 256	1748 ± 320	0.587
TEE (Kcal)	1801 ± 288	1744 ± 309	0.288
BMI	31.76 ± 5.20	30.3 ± 4.5	0.057

Data presented as mean ± SD
*Statistically significantly difference is P < 0.05
WC=waist circumference; BF=body fat; LBM=lean body mass; TBW= total body water; BMR=basal metabolic rate; BMI=body mass index, TEE=total energy expenditure

During the initial anthropometric measurements (before the implementation of the goals of the control and the intervention group), for the male group for all ages, the results were as followed (also see **table 7a**): the sample size of this group represented the 39% of the total. The mean weight 98,1kg ± 11, 5 while the waist circumference (WC) was 111,02cm ±8, 31. Waist circumference was more normally distributed among the healthier men and women than in the full sample. The values of 102 cm for men and 88 cm for women, recommended as cutoff points by National Heart Lung and Blood Institute (NHLBI 1998), corresponded fairly closely to the 95th percentile of waist circumference for healthy people, indicating that few healthy people will have values above these cutoffs. The lower action level values of 94 cm for men and 80 cm for women were more sensitive than the NHLBI cutoff values and correspondingly less specific. The overlap of waist circumference values between healthy and unhealthy people was considerable. Therefore the WC was considered higher than the normal for men. The Body Fat percentage (BF %) 38,45%± 6,83 can also be considered higher than

the mean for the ages 18-60 (for men) which is 10-21% (Gallagher 2000). The mean for the Lean Body Mass percentage (LBM %) was 61,54%±6,83 and it was lower than the normal percentage (>71%LBM) (Kyle, 2004). The mean of the Body Fluid Intake percentage (TBW%) was 43,05% ±26,24 and it was considerably lower than the normal range (55-60% TBW) (ibid). The Basal Metabolic Rate (BMR) was 2046,64 kcal±194,84.

The mean for the Body Mass Index (BMI) 32,06 (±3,3), which it represents obesity levels (>30) and is definitely higher than the normal weight levels (BMI=20-25) and also falling within the range of obesity (BMI>30) or with the lower range of SD within overweight (BMI= 25-30) (ibid). In all cases there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005)

During the initial anthropometric measurements or the female group for all ages and, the results were as followed (see also **table 7a**): the sample size of this group represented the 61% of the total. The mean weight 78,6kg ± 13,8 while the waist circumference (WC) was 92,60cm ±12,54. Waist circumference was more normally distributed among the healthier men and women than in the full sample. The values of 102 cm for men and 88 cm for women, recommended as cutoff points by National Heart Lung and Blood Institute (ibid), corresponded fairly closely to the 95th percentile of waist circumference for healthy people, indicating that few healthy people will have values above these cutoffs. The lower action level values of 94 cm for men and 80 cm for women were more sensitive than the NHLBI cutoff values and correspondingly less specific. The overlap of waist circumference values between healthy and unhealthy people was considerable. Therefore the WC was considered higher than the normal for female. The Body Fat percentage (BF %) 40,32%± 8,44 which can be considered higher than the normal range for the ages 18-60 (for female) which is 22-34% (Gallagher 2000). The mean for the Lean Body Mass percentage (LBM%) was 59,67%±8,44 and it was lower than the normal percentage (>71%LBM) (Kyle, 2004). The mean of the Body Fluid Intake percentage (TBW%) was 36,46% ±4,39 and it was considerably lower than the normal range (55-60% TBW (ibid). The Basal Metabolic Rate (BMR) was 1540,34 kcal±135,15..

The mean for the Body Mass Index (BMI) 30,21 (±5,51), which represents obesity levels (>30) and is definitely higher than the normal weight levels (BMI=20-25) and also falling within the range of obesity (BMI>30) or with the lower range of SD within overweight (BMI= 25-30) (ibid). In all cases there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005).

No significant differences were observed for both the control and Intervention groups during the baseline period (initial assessment) for weight, BF, WC and BMI (**Table 7b**)

Table 7b. Anthropometric characteristics for the study group.

	Male (n=131)	Female (n=206)	t-test (p-value)
Weight (kg)	98 ± 11,5	78,5 ± 13,8	0.001
Height (cm)	174 ± 6,4	161,4 ± 5,3	0.001
SBP (mmHg)	120 ± 11,8	116,8 ± 10,7	0.001
DBP (mmHg)	80,3 ± 9,6	77,2 ± 10,4	0.001
BMR	2046 ± 194	1540 ± 135	0.001
WC (cm)	111 ± 8,3	92,6 ± 12,5	0.001
BF (%)	38,5 ± 6,8	40,3 ± 8,4	0.001
LBM (%)	61,5 ± 6,8	59,7 ± 8,4	0.001
BMI	32,07±3,3	30,21±5,51	0.001

Values are presented as means ± SD
Statistically significant difference (P < 0.05)
SBP = Systolic Blood Pressure, DBP = Diastolic Blood Pressure
WC = Waist Circumference, BF = Body Fat ,LBM = Lean Body Mass

Results, Analysis and Discussion of the Questionnaire

Diet recall and nutrient frequency (Nutritional Habits, Calorie Control, Dietary Fat, and Dietary Salt).

Three day-Recall Analysis Dietary Reference Intakes- DRI

Table 8a. Daily intake on macronutrients, lipids, alcohol and fiber for the study group at baseline.

	Males(m) (n=131)	Females(f) (n=206)	%of DRI (m/f)	P-value	DRI	
					M(19-50)	F(19-50)
Energy (Kcal)	1683 ± 324	1556 ± 299	58/70	0.001	2900	2200
CHO (g)	185 ± 45	178 ± 44	185/178	0.001	100	100
PRO (g)	72 ± 16,6	65 ± 16,8	128/141	0.001	56	46
FAT (g)	73 ± 17,4	66 ± 17	-------	--------	ND	ND
SFA (g)	21 ± 6,9	20 ± 6,2	93/117	0.001	7% of total daily calories	7% of total daily calories
MUFA (g)	32 ± 8,2	28 ± 8	100/116	0.001	10% of total daily calories	10% of total daily calories
PUFA (g)	9,4 ± 3,7	8 ± 3,1	29/33	0.451	10% of total daily calories	10% of total daily calories
Total CIS (g)	35 ± 10,8	31 ± 10,1	-------	---------	ND	ND
Total TRANS (g)	1 ± 0,7	1 ± 0,5		0.352	<1% of total daily calories	<1% of total daily calories
CHOL (mg)	236 ± 144	201 ± 88	78/67	0.001	300	300
Fiber (g)	16 ± 5,8	14,9 ± 6,2	42/60	0.001	38	25
Alcohol (Kcal)	4,2 ± 9	2,1 ± 7,1	---------	---------	ND	ND

Values are presented as means ± SD
Statistical significant difference ($P < 0.05$)
CHO = Carbohydrates, PRO = Proteins, SFA = Saturated Fatty Acids
MUFA = Monounsaturated Fatty Acids, PUFA = Polyunsaturated Fatty Acids, DRI = Dietary Reference Intake, ND = None Determined

Table 8b. Daily intake of vitamins and minerals for the study group at baseline.

	Males (n=131)	Females (n=206)	P-value	DRI	
				M(19-50)	F(19-50)
Vitamin A(mcg RE)	640 ± 345	607 ± 310	0.001	900	700
Vitamin C (mg)	78 ± 47	64 ± 38	0.001	60	60
Vitamin B_1 (mg)	1,3 ± 0,4	1,1 ± 0,3	0.001	1	0.9
Vitamin B_2 (mg)	1,4 ± 0,5	1,3 ± 0,4	0.001	1.1	0.9
Vitamin B_6 (mg)	1,3 ± 0,4	1,1 ± 0,4	0.001	2.0	1.6
Calcium (mg)	725 ± 273	730 ± 273	0.001	1000	1000
Potassium (mg)	2236 ± 577	2054 ± 541	----------	ND	ND
Iron (mg)	10,6 ± 2,5	9,3 ± 2,4	0.001	6	8.1
Magnesium (mg)	233 ± 73	203 ± 64	0.001	400	310
Phosphorus (mg)	1129 ± 258	1049 ± 266	0.001	700	700
Sodium (mg)	2122 ± 687	1948 ± 580	0.323	2300	2300

Values are presented as means ± SD
Statistical significant difference ($P < 0.05$)
DRI = Dietary Reference Intake, ND = None Determined

The 3-day recall (**table 8a, 8b**) was completed by the entire sample (n=337). SPSS was used to analyze the results. The results were analyzed with the software programme "Food Data Base" (Medical School of Crete, Nutrition Department, 1995). The actual intake of the respondents on the dietary requirements of vitamins and minerals were measured against the Dietary Reference Intake (DRI) to determine whether the respondents were consuming adequate calories, macronutrients and micronutrients. DRI is the average level of daily dietary intake which is sufficient enough to meet nutrient requirements of 97– 98 percent of healthy persons in particular life stages and gender groups.

The mean daily intake of protein for male respondents was 71.6 g (SD ± 16.6) while the females had a mean daily protein intake of 64.7 g (SD ± 16.8) . These were higher than the DRI for protein which is 56 g (128% of DRI) for males and 46 g (141% of DRI) for females. This is an indication that they consumed more meat and other protein sources than the recommended daily consumption. This is supported by

the answers of the respondents from the intervention group on their frequency of eating meats and their proportion of meat intake discussed later in the paper.

The calcium, magnesium, and vitamin A consumption were lower than the DRI probably because participants do not consume many of the food sources that contain these vitamins and minerals. Later in the paper, although specific for the intervention group only, it can be seen that at the beginning of the program the participants were not consuming low fat high calcium food sources. This can be the reason for the inadequate intake of calcium and probably the other vitamins and minerals.

The assessment of nutrition involved looking at four key dietary factors:

1. Prudent Diet- eating habits referring to general nutritional balance.
2. Calorie Control - eating habits pertaining to weight loss and gain.
3. Dietary Fat/Cholesterol -eating habits referring to habits that affect fat/cholesterol in the diet.
4. Sodium or Salt Control eating habits referring to habits which affects blood pressure.

All four of these dietary factors have an influence as to whether or not your diet contributes to high of body weight and increase risk factors for leading health problems (heart disease, diabetes, cancer). The scoring of the different dietary factors was rated as followed:

Scoring results for the questionnaires

Excellent = 6-8 points

Good = 9-12 points

Fair = 13-16 points

Poor = 17-20 points

Very poor = 21-24 points

According to the initial assessment derived from the analysis of the questionnaire on the scoring part of the prudent diet, the majority of the participants (79.6%) were rated as good (for results see appendix 3). The presentation and analysis of the questions of the four dietary factors are shown in table 13.

Furthermore, the initial assessment derived from the analysis of the questionnaire on the scoring part of the calorie control showed that the majority of the participants (80.7%) were rated as excellent (for results see appendix 3).

Furthermore, the initial assessment derived from the analysis of the questionnaire on the scoring part of the fat control showed that the majority of the participants (80.7%) were rated as excellent (for results see appendix 3).

Furthermore, the initial assessment derived from the analysis of the questionnaire on the scoring part of the calorie control showed that the majority of the participants (85.1%) were rated as excellent (for results see appendix 3).

Table 13 shows the accumulative results of the highest rated answer of the nutritional assessment for each question for each category.

The term “prudent diet” has been in use to describe the fat- and cholesterol-controlled diet followed by subjects participating in the anticoronary program of the New York City Department of Health since 1957 (Livingston 1973). This diet as do diets used in similar studies elsewhere curtails the intake of eggs, whole milk, and whole milk-based dairy products, liver, shellfish, and commercial pastry products. Lean meats are permitted but preference is given to fish which is recommended for use at least four or five times a week (ibid).

With the advent of new products, such as 99% fat-free milk, cholesterol-free egg products, and highly polyunsaturated margarines, diet modification for the average

consumer is becoming an easier task. Attention of the food industry is focused on needs still remaining unfilled such as reduced-cholesterol eggs in a natural form, leaner beef, pork, and lamb, and formulated and prepared foods, snack products, and pastry products made using polyunsaturated oils. The availability of such products would facilitate the public's adherence to the recommendations made by the American Health Foundation, i.e., limiting fat intake to 35% of calories, consuming isocaloric levels of poly to mono to saturated fatty acids and limiting cholesterol intake to 300 mg per day (ibid). Nowadays, using the large cohorts of Nurses' Health Study and Health Professionals' Follow-up Study, we have identified two major dietary patterns: the "Prudent pattern" is characterized by higher intakes of fruits, vegetables, legumes, whole grains, poultry, and fish. The Prudent diet is associated with a significantly lower risk of coronary heart disease (Hu 2000; Fung 2001), type 2 diabetes (van Dam 2002) and colorectal cancer (Fung 2003). Furthermore, prudent diet is associated with lower BMI (Fung 2001). These data suggest a potential role of substituting Prudent diet components (fruits, vegetables, whole grains, legumes, fish, and poultry) for Western diet components (red and processed meats, refined grains, sweets, potatoes, and French fries) in weight control and obesity prevention. Such a dietary strategy, using a simple and friendly food-based dietary counseling plus portion control, should be easier to be communicated to the public and to be implemented in dietary practice.

As far as concern the prudent diet assessment of this specific study (table 10), the 83.4% of all the participants at the initial nutritional assessment were consuming 480g of milk or yogurt or 90gr cheese per week. This amount offers 600mg Ca. According to DRI (see appendix) the recommended amount is 1000mg per day. Therefore the daily consumption of calcium was lower at the initial assessment.

The 41.5% of the participants claimed that the they did not eat or they rarely ate potato chips, corn chips, olives, nuts, or similar foods as snacks or with a meal. The 57.5% of them ate 1-3 servings of fruits daily and the 38.4% consumed 1-2 servings of whole grain breads/ cereals/ bran products daily. Furthermore the 33.3% consumed vegetables at one meal a day and the 47.3% drunk ≥9 glasses of water per day.

On part of the calorie control of the questionnaire the 40% they described themselves as eating what is served and cleaning their plate. The 44.1% of them claimed that if they wanted to decrease their calorie intake, they would limit portion sizes. The 41.9% said that they never or rarely drunk alcohol while the 56.8% said that they rarely or on special occasions ate until they were so full that they were so uncomfortable. The 48.5% said that they ate sweets only on special occasions or they did not eat any sweets. The 35.2% claimed that they regular meals at frequent intervals.

On the part of the Dietary Fat/ Cholesterol Control of the questionnaire, the 63.9% said that they ate eggs for breakfast or another meal for ≤1 per week whereas the 71.9% did not eat red meat at all. The 30.2% of the participants of the initial assessment claimed that when they ate poultry, they chose white meat, they removed the skin and they baked it or broiled it. The 34.4% chose low fat cheese for their salads and sandwiches and the 60.6% they selected low fat products (1-2%fat) when they ate dairy products. Finally, for this part of the questionnaire the 43.1% preferred their potato boiled or baked with no added fat.

For the last part of the nutritional assessment, the sodium/ salt control, the 44.4% stated that they never add salt to the food after it is served at the table and 43.5% of them said that they rarely ate at fast food restaurants and that when they did they always selected from the salad bars. The 57.1% of them ate rarely or never any of the following foods: hot dogs, luncheon meat, bacon, ham, sausage, loutza, roast beef while the 71.6% purchased food or meal preparations in the fresh form. Lastly the 42.7% while preparing meals or when eating out, never or rarely added any or all of the following items to the food: mustard, pickles, relish, soy sauce, ketchup, meat tenderizer, MSG.
The fact that in the four parts of the nutritional assessment (prudent diet, calorie control, dietary fat/ cholesterol control, sodium/salt control) the respondents of the questionnaire scored to have good to excellent diet, this is proven to be not enough for weight management and the enforcement of the behaviour modification is necessary.

Table 9. The accumulative results for the nutritional assessment of the checklists

a)Prudent Diet			%
How much low fat or skim milk yogurt and cheese do you consume in a week?	At least 480 g. milk or yogurt or 90 g. cheese per week		83,4
How often do you choose to eat potato chips, corn chips, olives or similar foods as snacks or with a meal?	None or rarely		41,5
How many servings of fruit do you eat per day?	1-3 times		57,5
How many servings of whole grain breads and cereals and bran products do you eat each day?	1-2 servings		38,4
Describe your consumption of vegetables:	Eat salads and vegetables at one meal a day		33,3
How many glasses of water do you drink in a day?	Nine and more		47,3
b)Calorie Control			%
Which most closely describes the amount of food you eat at one time?	Eat what is served and clean the plate		40
If you wanted to decrease caloric intake, which would you do?	Limit portion sizes		44,1
How many alcoholic beverages do you consume?	Rarely or never drink		41,9
Do you ever eat until you are so full that you are uncomfortable?	Rarely or on special occasions		56,8
How many sweets do you eat?	Only on special occasions or do not eat sweets		48,5
Which pattern of eating typifies your style?	Regular meals at frequent intervals		35,2
c)Dietary Fat / Cholesterol Control			%
How often do you eat eggs for breakfast or another meal?	Once per week or none		63,9
How many times per week do you consume red meat?	Do not consume red meat		71,9
When you prepare or eat poultry which of the following do you most closely follow?	Choose white meat, remove skin and bake or broil		30,2
When selecting a salad or sandwich, which of the following "fillings" do you usually choose?	Low fat cheese		34,4
When you eat dairy products. You select:	Low fat products (1-2% fat)		60,6
How do you prefer your potatoes?	Boiled or baked with no added fat		43,1
d)Sodium / Salt Cpntrol			%
How frequently do you add salt to your food after it is served at the table?	Never		44,4
How many times do you eat at a "fast food" restaurant?	Rarely and always select from the salad bar		43,5
How often do you eat any of the following foods (hot dogs, luncheon meat, bacon, ham, sausage, loutza, roast beef)?	Rarely or never		57,1
In what form do you most frequently purchase food or meal preparations?	Fresh		71,6
While preparing meals or when eating out, how frequently do you add any or all of the following items to your food (mustard, pickles, relish, soy sauce, ketchup, meat tenderizer, MSG?	Rarely or never		42,7

Nutrition Questions (Nutrition/Diet habits, lifestyle, medications)

Part 2 of the questionnaire was dealing partly with the nutritional/ diet habits of the sample (both control and intervention group). Table 11 shows accumulative the highest rated answers of their habits. All the results of the questionnaire are in appendix 3.

To be more specific, the 39% of the participants at the initial assessment did not drink alcohol, 39.4% did not consume artificial sweeteners, the 37.5% consumed or used weekly candy or other sweets and the 35.9% consumed or used weekly the carbonated beverages. The 93.2%, 86.7% and the 96.8% did not use chewing tobacco, cigarettes and cigars respectively. The 78.1% consumed coffee daily and the 41.3% consumed fat food 2-3 times per week whiles the 29.2% at fried foods 2-3 times per week. The 48.9% of them ate luncheon meats and the 28.6% ate margarine weekly. The 82.5% used dairy products daily, the 41.6% drunk non-herbal tea, the 40% consumed weekly refined flour/ baked goods and the 50.2% did not consume any refined sugar. The 47.2% used a vitamin/ mineral supplement. The 62.5% and the 48.9% did not use distilled water and tap water, respectively while the 71.7% used daily the well water. It was very interesting to observe that the 52.7% of the participants used to diet often.

Table 10. Nutritional and Diet Habits

		%
Alcohol	Do not consume or use	39,0
Artificial sweeteners	Do not consume or use	39,4
Candy or other sweets	Consume or use weekly	37,5
Carbonated beverages	Consume or use weekly	35,9
Chewing tobacco	Do not consume or use	93,2
Cigarettes	Do not consume or use	86,7
Cigars	Do not consume or use	96,8
Coffee	Consume or use daily	78,1
Eat fast food regularly	Consume or use 2-3 times	41,3
Fried foods	Consume or use 2-3 times	29,2
Luncheon meats / hot dogs	Do not consume or use	48,9
Margarine	Consume or use weekly	28,6
Milk products	Consume or use daily	82,5
Non-herbal tea	Do not consume or use	41,6
Refined flour / baked goods	Consume or use weekly	40,0
Refined sugar	Do not consume or use	50,2
Vitamins and minerals	Do not consume or use	47,2
Water, distilled	Do not consume or use	62,5
Water, tap	Do not consume or use	48,9
Water, well	Consume or use daily	71,7
Diet often	Do not consume or use	52,1

Source: Andreou et al 2005-2009

Results of International Physical Activity Questionnaire (IPAQ)

In the IPAQ questionnaire we were interested in finding out about the kinds of physical activities that people did as part of their everyday lives. The questions concerned /investigated the time spent being physically active in the last 7 days. Subjects were asked to answer each question even if they did not consider themselves to be active persons. They were asked to think about the activities they did at work, as part of their house and yard work, to get from place to place, and in their spare time for recreation, exercise or sport.

Furthermore they were asked to think about all the vigorous and moderate activities they participated in during the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Moderate

activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

The first section was about their work. This included paid jobs, farming, volunteer work, course work, and any other unpaid work they did outside their home. They were asked not to include unpaid work they might have done around the home, like housework, yard work, general maintenance, and caring for their family as this was a question in section 3.

Part 1 - JOB-RELATED PHYSICAL ACTIVITY

The following questions were about all the physical activity during the last 7 days as part of their paid or unpaid work. This did not include traveling to and from work.

In the question regarding the last 7 days, on how many days they did vigorous physical activities like heavy lifting, digging, heavy construction, or climbing up stairs as part of their work, they had to think about only those physical activities that they did for at least 10 minutes at a time. The results showed that 41% of the subjects did no vigorous activities, 49,2% one day/week, 4,4% two days/week, 2,2% three days/week, 1,6% four days/week, 0,3% five days/week and 1,3% seven days/week (for results see appendix 3).

Table 11

vigorous physical activities (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	129	41,0	41,0	41,0
	1	155	49,2	49,2	90,2
	2	14	4,4	4,4	94,6
	3	7	2,2	2,2	96,8
	4	5	1,6	1,6	98,4
	5	1	,3	,3	98,7
	7	4	1,3	1,3	100,0
	Total	315	100,0	100,0	

vigorous physical activities (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	129	41,0	41,0	41,0
	10	2	,6	,6	41,6
	30	4	1,3	1,3	42,9
	60	130	41,3	41,3	84,1
	70	2	,6	,6	84,8
	90	14	4,4	4,4	89,2
	120	17	5,4	5,4	94,6
	150	1	,3	,3	94,9
	180	11	3,5	3,5	98,4
	210	3	1,0	1,0	99,4
	240	1	,3	,3	99,7
	480	1	,3	,3	100,0
	Total	315	100,0	100,0	

In the question **table 12** they were asked to think about only those physical activities that they did for at least 10 minutes at a time, during the last 7 days, how many days did they do moderate physical activities like carrying light loads as part of their work (not including walking). The results showed that 49,2% did zero days/week, 25,4% did one day/week, 10,8 % did three days/week, 1,6% did four days/week, 1,9% did five days per week, 0,6^ did for six days and 1,6% did seven days/week.

Table 12

moderate physical activities (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	155	49,2	49,2	49,2
	1	80	25,4	25,4	74,6
	2	34	10,8	10,8	85,4
	3	28	8,9	8,9	94,3
	4	5	1,6	1,6	95,9
	5	6	1,9	1,9	97,8
	6	2	,6	,6	98,4
	7	5	1,6	1,6	100,0
	Total	315	100,0	100,0	

moderate physical activities (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	140	44,4	44,4	44,4
	60	94	29,8	29,8	74,3
	120	58	18,4	18,4	92,7
	180	20	6,3	6,3	99,0
	240	2	,6	,6	99,7
	360	1	,3	,3	100,0
	Total	315	100,0	100,0	

In the question **table 13** during the last 7 days, on how many days did they walk for at least 10 minutes at a time as part of their work (did not count any walking they did to travel to or from work) 6,7% zero days/week, 34,6% one day/week, 49,5% two days/week, 3,2% three days/week, 1,8% four days/week, 2,5% five days/week, 0,6% six days/week and 1,0% seven days/week.

Table 13

walk as part of your work (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	21	6,7	6,7	6,7
	1	109	34,6	34,6	41,3
	2	156	49,5	49,5	90,8
	3	10	3,2	3,2	94,0
	4	6	1,9	1,9	95,9
	5	8	2,5	2,5	98,4
	6	2	,6	,6	99,0
	7	3	1,0	1,0	100,0
	Total	315	100,0	100,0	

walk as part of your work (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	126	40,0	40,0	40,0
	10	2	,6	,6	40,6
	30	1	,3	,3	41,0
	60	120	38,1	38,1	79,0
	70	15	4,8	4,8	83,8
	75	2	,6	,6	84,4
	90	6	1,9	1,9	86,3
	120	21	6,7	6,7	93,0
	130	1	,3	,3	93,3
	140	1	,3	,3	93,7
	180	13	4,1	4,1	97,8
	240	1	,3	,3	98,1
	250	1	,3	,3	98,4
	300	2	,6	,6	99,0
	360	3	1,0	1,0	100,0
	Total	315	100,0	100,0	

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how they traveled from place to place, including places like work, stores, movies, and so on.

In the question **table 14** during the last 7 days, on how many days they travelled in a motor vehicle like a train, bus, car, or tram, 1,3% zero days/week, 2,2% one day/week, 46% two days/week, 1,3% three days/week, 1,0% four days /week, 24,4% five days/week and 23,8% seven days/week.

Table 14

travel in a motor vehicle (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	1,3	1,3	1,3
	1	7	2,2	2,2	3,5
	2	145	46,0	46,0	49,5
	3	4	1,3	1,3	50,8
	4	3	1,0	1,0	51,7
	5	77	24,4	24,4	76,2
	7	75	23,8	23,8	100,0
	Total	315	100,0	100,0	

travel in a motor vehicle (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	2,5	2,5	2,5
	10	1	,3	,3	2,9
	15	1	,3	,3	3,2
	30	31	9,8	9,8	13,0
	40	2	,6	,6	13,7
	45	1	,3	,3	14,0
	60	136	43,2	43,2	57,1
	75	1	,3	,3	57,5
	90	1	,3	,3	57,8
	120	65	20,6	20,6	78,4
	150	1	,3	,3	78,7
	165	1	,3	,3	79,0
	180	65	20,6	20,6	99,7
	420	1	,3	,3	100,0
	Total	315	100,0	100,0	

In the question **table 15** during the last 7 days, on how many they bicycle for at least 10 minutes at a time to go from place to place 66,1% zero days/week, 20,3% one day/week, 7,6% two days/week, 4,2% three days per week and 1,7% four days/week.

Table 15

bicycling from place to place (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	78	24,8	66,1	66,1
	1	24	7,6	20,3	86,4
	2	9	2,9	7,6	94,1
	3	5	1,6	4,2	98,3
	4	2	,6	1,7	100,0
	Total	118	37,5	100,0	
Missing	System	197	62,5		
Total		315	100,0		

bicycling from place to place (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	310	98,4	98,4	98,4
	15	1	,3	,3	98,7
	60	1	,3	,3	99,0
	120	2	,6	,6	99,7
	180	1	,3	,3	100,0
	Total	315	100,0	100,0	

In the question **table 16** during the last 7 days, on how many days they walked for at least 10 minutes at a time to go from place to place 36,1% did zero days/week, 8,3% did one day/week, 48,3% two days/week, 3,2% three days/week, 0,6% four days/week, 1,0% five days/week and 2,5% seven days/week.

Table 16

walk from place to place (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	114	36,2	36,2	36,2
	1	26	8,3	8,3	44,4
	2	152	48,3	48,3	92,7
	3	10	3,2	3,2	95,9
	4	2	,6	,6	96,5
	5	3	1,0	1,0	97,5
	7	8	2,5	2,5	100,0
	Total	315	100,0	100,0	

walk from place to place (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	108	34,3	34,3	34,3
	10	32	10,2	10,2	44,4
	15	29	9,2	9,2	53,7
	20	8	2,5	2,5	56,2
	30	12	3,8	3,8	60,0
	60	98	31,1	31,1	91,1
	70	2	,6	,6	91,7
	105	1	,3	,3	92,1
	120	22	7,0	7,0	99,0
	180	3	1,0	1,0	100,0
	Total	315	100,0	100,0	

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities they have done in the **last 7 days** in and around their home, like housework, gardening, yard work, general maintenance work, and caring for your family.

In the question **table 17** they had to think about only those physical activities that they did for at least 10 minutes at a time, during the last 7 days, how many days they did vigorous physical activities (like heavy lifting, chopping wood, shoveling snow, or digging in the garden or yard), 72,7 did zero days/week, 19% one day/week, 6,0% two days/week, 1,6% three days/week, 0,6% four days/week.

Table 17

vigorous physical activities in the garden or yard (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	229	72,7	72,7	72,7
	1	60	19,0	19,0	91,7
	2	19	6,0	6,0	97,8
	3	5	1,6	1,6	99,4
	4	2	,6	,6	100,0
	Total	315	100,0	100,0	

vigorous physical activities in the garden or yard (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	206	65,4	65,4	65,4
	1	8	2,5	2,5	67,9
	2	1	,3	,3	68,3
	10	1	,3	,3	68,6
	60	60	19,0	19,0	87,6
	70	1	,3	,3	87,9
	120	28	8,9	8,9	96,8
	121	2	,6	,6	97,5
	122	1	,3	,3	97,8
	180	3	1,0	1,0	98,7
	240	4	1,3	1,3	100,0
	Total	315	100,0	100,0	

In the question **table 18** they had to think about only those physical activities that they did for at least 10 minutes at a time, during the last 7 days, on how many days they did moderate activities like carrying light loads, sweeping, washing windows, and raking in the garden or yard, 71,4% did zero days/week, 11,4% did one day/week, 7,9% did two days/week, 5,4% did three days/week, 2,2% did four days/week, 1,0% did five days/week and 0,6% did seven days/week.

Table 18

moderate physical activities in the garden or yard (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	225	71,4	71,4	71,4
	1	36	11,4	11,4	82,9
	2	25	7,9	7,9	90,8
	3	17	5,4	5,4	96,2
	4	7	2,2	2,2	98,4
	5	3	1,0	1,0	99,4
	7	2	,6	,6	100,0
	Total	315	100,0	100,0	

moderate physical activities in the garden or yard (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	190	60,3	60,3	60,3
	1	1	,3	,3	60,6
	3	1	,3	,3	61,0
	10	2	,6	,6	61,6
	30	4	1,3	1,3	62,9
	60	69	21,9	21,9	84,8
	70	4	1,3	1,3	86,0
	90	2	,6	,6	86,7
	120	22	7,0	7,0	93,7
	130	4	1,3	1,3	94,9
	180	7	2,2	2,2	97,1
	240	2	,6	,6	97,8
	250	2	,6	,6	98,4
	300	2	,6	,6	99,0
	360	2	,6	,6	99,7
	421	1	,3	,3	100,0
	Total	315	100,0	100,0	

In the question **table 19** they had to think about only those physical activities that they did for at least 10 minutes at a time, during the last 7 days, on how many days they did moderate activities like carrying light loads, washing windows, scrubbing floors and sweeping inside your home 52,4% zero days/week, 19% one day/week, 22,5% two days/week, 3,8% three days/week, 1,3% four days/week and 1,0% five days/week.

Table 19

moderate inside your home (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	165	52,4	52,4	52,4
	1	60	19,0	19,0	71,4
	2	71	22,5	22,5	94,0
	3	12	3,8	3,8	97,8
	4	4	1,3	1,3	99,0
	5	3	1,0	1,0	100,0
	Total	315	100,0	100,0	

moderate inside your home (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	104	33,0	33,0	33,0
	1	3	1,0	1,0	34,0
	10	2	,6	,6	34,6
	30	4	1,3	1,3	35,9
	60	97	30,8	30,8	66,7
	61	2	,6	,6	67,3
	70	1	,3	,3	67,6
	90	2	,6	,6	68,3
	120	45	14,3	14,3	82,5
	130	1	,3	,3	82,9
	150	3	1,0	1,0	83,8
	180	45	14,3	14,3	98,1
	181	1	,3	,3	98,4
	210	1	,3	,3	98,7
	240	3	1,0	1,0	99,7
	480	1	,3	,3	100,0
	Total	315	100,0	100,0	

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that they did in the **last 7 days** solely for recreation, sport, exercise or leisure. (Not including any activities that they had already mentioned).

In the question **table 20** during the last 7 days, on how many days they walked for at least 10 minutes at a time in their leisure time 35,9% zero days/week, 26,7% one day/week, 13,3% two days/week, 22,9% three days/week, 1,0% five days/week and 0.3% seven days/week.

Table 20

walk in your leisure time (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	113	35,9	35,9	35,9
	1	84	26,7	26,7	62,5
	2	42	13,3	13,3	75,9
	3	72	22,9	22,9	98,7
	5	3	1,0	1,0	99,7
	7	1	,3	,3	100,0
	Total	315	100,0	100,0	

walk in your leisure time (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	98	31,1	31,1	31,1
	1	7	2,2	2,2	33,3
	10	1	,3	,3	33,7
	11	1	,3	,3	34,0
	20	1	,3	,3	34,3
	30	5	1,6	1,6	35,9
	40	2	,6	,6	36,5
	60	66	21,0	21,0	57,5
	61	6	1,9	1,9	59,4
	70	2	,6	,6	60,0
	75	2	,6	,6	60,6
	80	1	,3	,3	61,0
	90	2	,6	,6	61,6
	100	1	,3	,3	61,9
	120	85	27,0	27,0	88,9
	121	1	,3	,3	89,2
	150	1	,3	,3	89,5
	180	29	9,2	9,2	98,7
	181	2	,6	,6	99,4
	300	2	,6	,6	100,0
	Total	315	100,0	100,0	

In the question **table 21** they had to think about only those physical activities that they did for at least 10 minutes at a time, during the last 7 days, on how many days they did vigorous physical activities like aerobics, running, fast bicycling, or fast swimming in your leisure time, 39,4% zero days/week, 21,3% one day/week, 33,9% two days/week, 1,4% three days/week, 2,7% four days/week, 2,7% four days/week, 0,9% five days/week and 0,5% six days/week.

Table 21

vigorous physical activities in your leisure time (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	87	27,6	39,4	39,4
	1	47	14,9	21,3	60,6
	2	75	23,8	33,9	94,6
	3	3	1,0	1,4	95,9
	4	6	1,9	2,7	98,6
	5	2	,6	,9	99,5
	6	1	,3	,5	100,0
	Total	221	70,2	100,0	
Missing	System	94	29,8		
Total		315	100,0		

vigorous physical activities in your leisure time (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	143	45,4	45,4	45,4
	20	1	,3	,3	45,7
	30	1	,3	,3	46,0
	45	1	,3	,3	46,3
	60	126	40,0	40,0	86,3
	80	1	,3	,3	86,7
	90	1	,3	,3	87,0
	105	1	,3	,3	87,3
	120	31	9,8	9,8	97,1
	180	9	2,9	2,9	100,0
	Total	315	100,0	100,0	

In the question **table 22** they had to think about only those physical activities that they did for at least 10 minutes at a time, during the last 7 days, on how many days they did moderate physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis in your leisure time 57,5% did zero days/week, 34,3% did one day/week and 8,3% did two days/week.

Table 22

moderate physical activities in your leisure time (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	180	57,1	57,5	57,5
	1	107	34,0	34,2	91,7
	2	26	8,3	8,3	100,0
	Total	313	99,4	100,0	
Missing	System	2	,6		
Total		315	100,0		

moderate physical activities in your leisure time (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	163	51,7	51,7	51,7
	1	2	,6	,6	52,4
	30	14	4,4	4,4	56,8
	60	16	5,1	5,1	61,9
	61	1	,3	,3	62,2
	90	3	1,0	1,0	63,2
	120	14	4,4	4,4	67,6
	180	10	3,2	3,2	70,8
	181	1	,3	,3	71,1
	240	1	,3	,3	71,4
	300	8	2,5	2,5	74,0
	330	1	,3	,3	74,3
	360	7	2,2	2,2	76,5
	420	2	,6	,6	77,1
	480	4	1,3	1,3	78,4
	510	1	,3	,3	78,7
	540	42	13,3	13,3	92,1
	600	6	1,9	1,9	94,0
	720	17	5,4	5,4	99,4
	900	2	,6	,6	100,0
	Total	315	100,0	100,0	

PART 5: TIME SPENT SITTING

The last questions are about the time they spend sitting while at work, at home, while doing course work and during leisure time. This may have included time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. (Did not include any time spent sitting in a motor vehicle that you have already told)

In the question **table 23**, during the last 7 days, how much time they usually spent sitting on a weekday 1,3% zero hours/day, 0,6% hour per/day, 2,2% two hours/day, 4,8% three hours/day, 1,3% four hours/day, 8,6% five hours/day, 7% six hours/day, 12,7% seven hours/day, 17,1% eight hours/day, 20,3% nine hours/day, 3.5% ten hours/day, 2,2% eleven hours/day, 12,1% twelve hours/day, 2,9% thirteen hours/day, 1,3% fourteen hours/day and 2,2% fifteen hours /day.

Table 23

sitting on a weekend day (days)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	1,3	1,3	1,3
	1	2	,6	,6	1,9
	2	7	2,2	2,2	4,1
	3	15	4,8	4,8	8,9
	4	4	1,3	1,3	10,2
	5	27	8,6	8,6	18,7
	6	22	7,0	7,0	25,7
	7	40	12,7	12,7	38,4
	8	54	17,1	17,1	55,6
	9	64	20,3	20,3	75,9
	10	11	3,5	3,5	79,4
	11	7	2,2	2,2	81,6
	12	38	12,1	12,1	93,7
	13	9	2,9	2,9	96,5
	14	4	1,3	1,3	97,8
	15	7	2,2	2,2	100,0
	Total	315	100,0	100,0	

sitting on a weekend day (minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	100	31,7	31,7	31,7
	120	3	1,0	1,0	32,7
	180	13	4,1	4,1	36,8
	240	4	1,3	1,3	38,1
	300	10	3,2	3,2	41,3
	330	2	,6	,6	41,9
	360	39	12,4	12,4	54,3
	362	1	,3	,3	54,6
	420	34	10,8	10,8	65,4
	450	2	,6	,6	66,0
	480	43	13,7	13,7	79,7
	540	22	7,0	7,0	86,7
	542	1	,3	,3	87,0
	570	2	,6	,6	87,6
	600	11	3,5	3,5	91,1
	720	27	8,6	8,6	99,7
	3960	1	,3	,3	100,0
	Total	315	100,0	100,0	

The IPAQ was translated into Greek and translated back into English using the instructions given in the IPAQ manual for reliability and validity. The long, self-administered IPAQ covers four domains of physical activity: work-related, transportation, housework/gardening and leisure-time activity. The questionnaire also includes questions about time spent sitting as an indicator of sedentary behaviour. In each of the four domains the number of days per week and time per day spent in both moderate and vigorous activity are recorded. At work, during transportation and in leisure time, walking time is also included. Practical examples of culturally relevant activities of moderate and vigorous intensity are given. In this study, moderate intensity was defined as 3–6 MET (Metabolic Equivalent Task) and vigorous intensity was defined as more than 6 MET. A metabolic equivalent, or MET, is a unit useful for describing the energy expenditure of a specific activity. A MET is the ratio of the rate of energy expended during an activity to the rate of energy expended at rest. For example, 1 MET is the rate of energy expenditure while at rest. A 4 MET activity expends four times the energy used by the body at rest. If a person does a 4 MET activity for 30 minutes, he or she has done 4 x 30 = 120 MET-minutes (or 2.0 MET-hours) of physical activity. A person could also achieve 120 MET-minutes by doing an 8 MET activity for 15 minutes.

Outcome measures used were: (1) MET hours per week and hours reported in moderate and vigorous intensity activity per week.

To calculate the weekly physical activity (MET-h week), the number of hours/minutes dedicated to each activity class was multiplied by the specific MET score for that activity (for example - the 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day and for vigorous- intensity activity we use the Vigorous-intensity activity on at least 3 days and accumulating at least 1500).

IPAQ Scoring Protocol (Long Forms)

Continuous Score
Expressed as MET-minutes per week: MET level x minutes of activity/day x days per week
Sample Calculation
MET levels MET-minutes/week for 30 min/day, 5 days
Walking at work= 3.3 METs 3.3*30*5 = 495 MET-minutes/week
Cycling for transportation= 6.0 METs 6.0*30*5 = 900 MET-minutes/week
Moderate yard work= 4.0 METs 4.0*30*5 = 600 MET-minutes/week
Vigorous intensity in leisure= 8.0 METs 8.0*30*5 = 1,200 MET-minutes/week

TOTAL = 3,195 MET-minutes/week

Domain Sub Scores
Total MET-minutes/week at work = Walk (METs*min*days) + Mod (METs*min*days) + Vig (METs*min*days) at work
Total MET-minutes/week for transportation = Walk (METs*min*days) + Cycle (METs*min*days) for transportation
Total MET-minutes/week from domestic and garden = Vig (METs*min*days) yard work + Mod (METs*min*days) yard work + Mod (METs*min*days) inside chores

Total MET-minutes/week in leisure-time = Walk (METs*min*days) + Mod (METs*min*days) + Vig (METs*min*days) in leisure-time

Walking, Moderate-Intensity and Vigorous-Intensity Sub Scores
Total Walking MET-minutes/week = Walk MET-minutes/week (at Work + for Transport + in Leisure)
Total Moderate MET-minutes/week = Cycle MET-minutes/week for Transport + Mod MET minutes/week (Work + Yard chores + Inside chores + Leisure) + Vigorous Yard chores MET minutes
Note: The above is a total moderate activities only score. If you require a total of all moderate-intensity physical activities you would sum Total Walking and Total Moderate
Total Vigorous MET-minutes/week = Vig MET-minutes/week (at Work + in Leisure)
Total Physical Activity Score
Total Physical Activity MET-minutes/week = Walking MET-minutes/week + Moderate MET minutes/week + Total Vigorous MET-minutes/week

Also
Total Physical Activity MET-minutes/week = Total MET-minutes/week (at Work + for Transport + in Chores + in Leisure)
Categorical Score- three levels of physical activity are proposed

1. Low
No activity is reported OR
a. Some activity is reported but not enough to meet Categories 2 or 3.

2. Moderate
Any of the following 3 criteria
a. 3 or more days of vigorous-intensity activity of at least 20 minutes per day OR
b. **5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day** OR
c. 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 600 MET-min/week.

3. High
Any one of the following 2 criteria
• **Vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week** OR
• 7 or more days of any combination of walking, moderate- or vigorous- intensity activities accumulating at least 3000 MET-minutes/week

Over the last three decades, the American College of Sports Medicine (ACSM) has recommended physical activity and exercise guidelines. While these guidelines have changed dramatically over the years, and while other groups have offered alternatives, the ACSM recommendations still remain the core for physical activity programming.

In 1978, the ACSM recommended that individuals exercise three to five days a week for 15 to 60 minutes, with an overall goal of expending 300 kcal per activity session. The next update of these guidelines occurred in 1990. ACSM retained the aerobic component of its original guidelines but added a strength training recommendation and underscored the importance of realistic, personalized exercise programming. The most recent ACSM recommendations for physical activity were published in 2006 in conjunction with the Centers for Disease Control and Prevention (CDC). At this time, several modifications were made to existing components of the ACSM guidelines. The aerobic component was increased to a minimum of 30 minutes of moderate intensity physical activity on most days of the week. Additionally, ACSM recognized that physical activity has an additive effect, and suggested that three 10-minute bouts of physical activity could provide health benefits similar to that obtained with one 30-minute session.

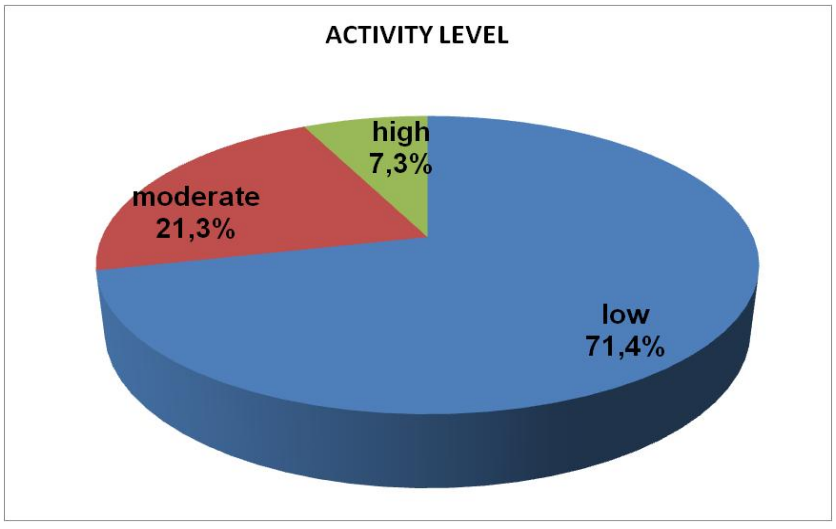
Currently, the 2006 ACSM guidelines remain in use. However, these physical activity guidelines are not uniformly agreed upon due to the introduction of recommendations from other well-regarded scientific groups. For example, the Institute of Medicine (IOM)

recommends 60 minutes of moderate intensity physical activity each day. In addition, the President's Council on Physical Fitness and Sports (PCPFS) recommends 20 minutes of vigorous activity at least three times per week, whereas the American Heart Association recommends 30-60 minutes of physical activity five to seven days per week. These competing recommendations have created a debate as to which guidelines should be adopted for public health initiatives.

Regardless of the recommendation to be used, the health benefits of regular physical activity are well established (Welk & Blair 2001; FITNESSGRAM). In 1996, The Surgeon General of the United States issued a report titled "Physical Activity and Health" that summarized the contemporary consensus regarding the health benefits of physical activity (U.S. Department of Health and Human Services 1996).

Significant health benefits can be obtained by including a moderate amount of physical activity (e.g., 30 minutes of brisk walking or raking leaves, 15 minutes of running, or 45 minutes of playing volleyball) on most, if not all, days of the week. Through a modest increase in daily activity, most Americans can improve their health and quality of life.

According to the IPAQ questionnaire for initial assessment in this study 71,4% of the subjects reported a low activity level, 21.3% moderate and 7,3% high.



PROGRESS CHART

The progress chart was a chart developed by the two researchers in order to record the anthropometric results of the control and intervention group. The results were gone through statistical analysis with the use of SPSS and there were analysed based on their group (control or intervention), age, gender, and time period of the treatment (initial assessment, end of weight loss period18 weeks, and end of the maintenance period 36 weeks).

Successful ("good"/ "positive") Results of Behaviour Modification (intervention Group) N total = 176 Total N = 337, Weeks 1-18, according to age and gender

During the intervention period, weight, BMI and WC decreased significantly in the control group. In addition, body fat levels were significantly reduced ($p < 0.001$) in the intervention group compared to the control group (Table 24).

Weight loss and percent body fat loss were significantly decreased in the Intervention intervention group compared to the control group while reductions in FFM were significantly lower in the intervention group (Table 25, Figures 1-2).

Body fat levels were positively correlated with weight, BMI and WC (Table 26).

In linear regression analysis BF levels were independently and significantly associated with weight, BMI and WC after adjustment for age, gender and energy intake (Table 27).

Data for continuous variables are expressed as mean values ± one standard deviation. Category variables are expressed as absolute numbers and percentages. In order to remove the influence of starting levels (baseline measurements) from the parameter variance, analysis of covariance was also performed. Mixed between-within subjects, analysis of variance was used in order to assess the presence of significant differences between groups. Groups were divided by intervention follow-up (D and DE group) and by time of assessment (baseline, 18-weeks). Correlation between variables was analyzed by Pearson's method. Linear regression analysis was performed to estimate the relationship between body fat levels and weight, BMI, WC, LBM and BMR. Data analysis was

performed by employing the SPSS statistical package (Version 16.5; SPSS, Chicago, IL), and the level of statistical significance was set at $p < 0.05$.

We report data from the first, to the best of our knowledge, randomized controlled study to investigate the effects of a calorie-reduced diet on body weight, body composition and measures of central adiposity in overweight and obese individuals from Cyprus. While both groups exhibited reductions in total body mass and visceral abdominal mass, the caloric restricted plus exercise group experienced greater improvement in fat mass compared by the diet alone group. Our results strongly suggest that inclusion of regular exercise in a weight loss program leads to reduction in BF levels, which may yield possible future health benefits beyond those of weight loss alone.

It is well known that physical activity is associated with loss of body fat and visceral fat, which has been found to correlate positively with cardiovascular disease. Increased fatness has also been found to be associated with increased ectopic fat deposition in skeletal muscle and the liver, which may influence the insulin signaling cascade and impact on circulating lipids. The most important finding of our study was the significant reduction of body fat levels observed in the Intervention group. The average body weight loss for the Control and Intervention group was 5.5 kg and 12 kg, respectively. However, the Intervention group reduced body fat mass by 10.5 kg compared with only 2.6 kg in the control group. Because fat is more calorically dense than FFM, subjects that exercised had a much greater loss of body energy than non-exercising subjects. This suggests that exercise can have favorable effects on body composition when used in a weight-reduction program.

A second important finding from the study was the reduction of waist circumference in both control and intervention groups. The importance of central body fat as an independent risk factor for cardiovascular disease, type 2 diabetes mellitus, and hypertension is well established. Since diet-induced weight loss is also associated with a disproportionately large visceral fat loss, it is possible that caloric deficit will create similar visceral fat losses, regardless of whether the restriction is induced by diet or exercise.

Exercise appears to contribute to body weight reduction in two ways: 1) the energy expended in exercise contributes directly to the negative energy balance and 2) exercise produces a more favorable composition of weight loss during food restriction.

A food restriction program acts by preventing the decline in RMR that occurs when humans diet. In this study RMR declined in both groups with food restriction. Although the decline in RMR was not significantly different for the two groups, these results do not rule out the possibility that exercise affected RMR, as others have reported. Exercise did not return RMR to the predicted levels in the present study. However, work with rats suggests that RMR declines in proportion to the magnitude of the caloric deficit, if the caloric deficit is produced by food restriction. Exercising subjects in this study had a greater caloric deficit than non-exercising subjects (from the energy cost of the exercise), but no greater decline in RMR. This may have been because the extra deficit was produced by increasing energy expenditure rather than by further reducing food intake.

By comparing the two groups, there was an indication that the interention group resulted in a greater increase in lean body mass compared with the Control group. This finding could have significant ramifications, suggesting that exercise determines not only total body weight change and fat mass loss but also leads to a gain in lean body mass tissue. This is in accordance with a meta-analysis that shows that exercise training preserves FFM during diet-induced weight loss.

Despite the overall success of this intervention program the study has some limitations, which include the error in estimating RMR and TEE using the Harris Benedict equation, the collection of accurate records of dietary intakes by the participants, blood serum profiles as well as cardio-metabolic factors. Also, currently we are in the process of re-evaluating these subjects and very soon the outcomes of the follow up 18-week maintenance period will be submitted for publication.

Nevertheless, it is very important to report for the first time data of 337 overweight and obese subjects from Cyprus regarding the effects of a weight loss program with and without exercise.

Table 24. Characteristics of all subjects (n = 337) in baseline and after 18 weeks for both groups**

	Control (n = 145)			Intervention (n=192)		
	Baseline	18 weeks	P-value	Baseline	18 weeks	P-value
Weight (kg)	86.8 ± 15.41	81.27 ± 15.17	0.002*	85.6 ± 16.6	73.6 ± 15.06	0.001*
WC (cm)	100.75 ± 14.6	95.06 ± 15.5	0.002*	90.02 ± 13.9	87.3 ± 12.4	0.001*
BF (%)	40.33 ± 8.47	39.15 ± 9.17	0.575	39.05 ± 7.3	30.8 ± 7.4	0.001*
BF (Kg)	34.20 ± 6.60	31.67 ± 6.31	0.076	33.32 ± 6.44	22.81 ± 4.9	0.001*
LBM (%)	59.67 ± 8.57	57.85 ± 9.17	0.049*	60.9 ± 7.3	69.1 ± 7.4	0.001*
TBW (%)	37.34 ± 4.63	38.96 ± 4.88	0.004*	40.3 ± 2.1	42.7 ± 4.5	0.001*
BMR	1722 ± 256	1662 ± 249	0.055	1748 ± 320	1611 ± 285	0.076
TEE	2001 ± 288	1962 ± 271	0.441	2790 ± 390	2760 ± 318	0.001*
BMI	31.76 ± 5.20	29.71 ± 5.10	0.001*	30.3 ± 4.5	26.04 ± 3.9	0.001*

Data presented as mean ± SD
*Statistically significantly difference is ($P < 0.05$)
**Adjusted for Energy Intake
WC=waist circumference; BF=body fat; LBM=lean body mass; TBW= total body water; BMR=basal metabolic rate; BMI=body mass index, TEE=Total energy expenditure

Table 25. Weight loss, fat loss and loss of fat-free mass after 18 weeks of diet alone (Control) or diet with exercise and behaviour modification (Intervention)

	Control (n=142)	Intervention (n=195)	t-test (p-value)
Weight loss (kg)	5.5 ± 0.8	12 ± 0.9	0.001*
Fat loss (kg)	2.6 ± 0.9	10.5 ± 0.8	0.001*
Fat free mass loss (kg)	2.9 ± 0.7	1.5 ± 0.8	0.007*

Data presented as mean ± SD
Statistically significantly difference is $P < 0.05$

Table 26: Correlations with body fat (N = 337)

	Pearson's correlation (r)	P-value
Weight kg	0.831	0.001
BMI, kg/m2	0.653	0.001
WC, cm	0.662	0.001
LBM	-0.442	0.655
BMR	-0.384	0.432

WC=waist circumference; LBM=lean body mass; BMR=basal metabolic rate; BMI=body mass index

Table 27. Parameters associated with body fat levels by linear regression analysis after adjusting for age, gender and energy intake.

Parameters	Beta	95% CI	P-value
Weight	0.569	0.157-1.296	0.001*
WC	0.206	0.095-0.954	0.001*
BMI	0.295	0.088-1.214	0.001*
BMR	-0.663	(-0.151-0.097)	0.474

* Statistical significant difference is $P < 0.05$
BMI= Body Mass Index; WC=Waist Circumference; BMR= Basal Metabolic Rate

FIGURE 1. Changes in Body Weight during the 18 week period for both control and intervention group.

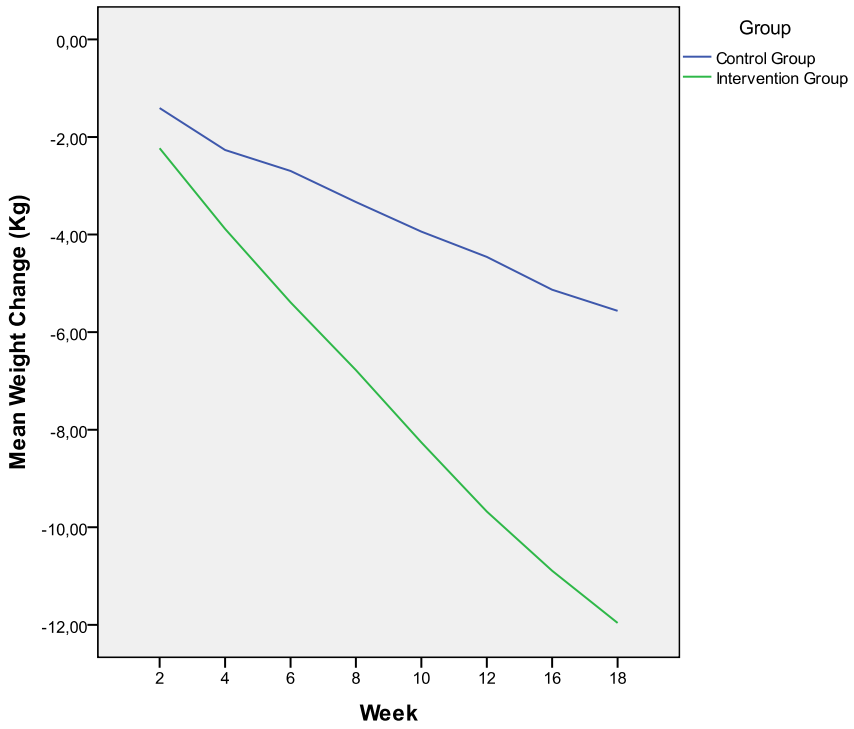


FIGURE 2. Changes in percentage Body Fat during the 18 week period for both control and intervention group.

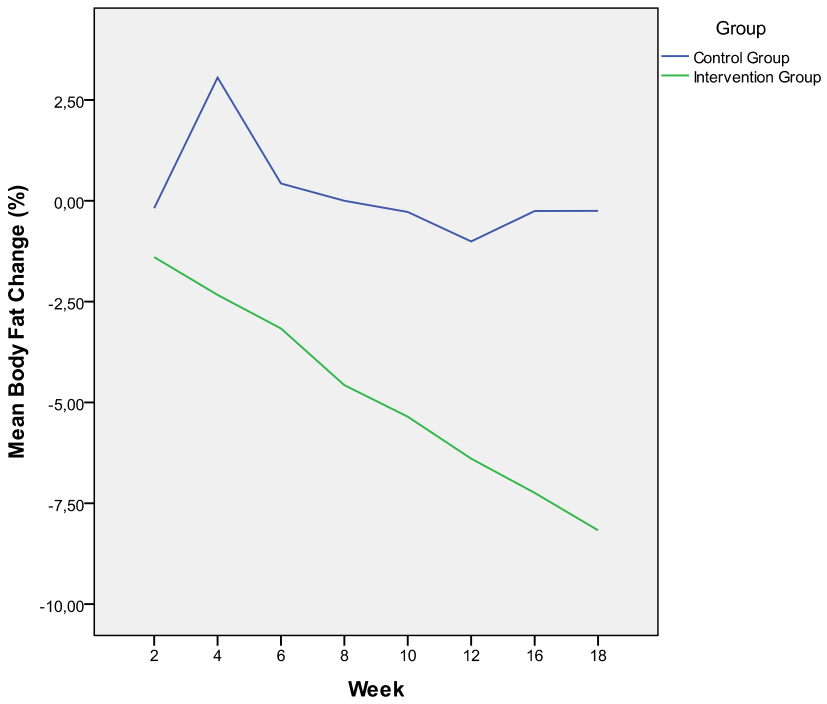


Table 28a. Progress chart for intervention group for weeks 1-18: Males 18-25 y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	20	101,10	-14,97	9,14	0,000
	18	20	86,13		8,33	
WC	1	20	107,95	-14,55	6,21	0,000
	18	20	93,40		5,21	
BF	1	20	37,64	-10,10	7,39	0,000
	18	20	27,54		7,54	
LBM (%)	1	20	62,35	10,11	7,39	0,000
	18	20	72,46		7,54	
TBW(%)	1	20	40,86	4,66	2,24	0,000
	18	20	45,52		2,81	
BMR	1	20	2174,82	-205,09	129,42	0,000
	18	20	1969,73		118,42	
BMI	1	20	32,89	-4,87	2,68	0,000
	18	20	28,02		2,51	

For the age group 18-25 for males from the intervention group, the group underwent behaviour modification therapy for weight management and the results were as follows **(table 28a)**: the sample size of this group represented 11,36% of the intervention group and 5,93% of the total group. The mean weight loss for the weight loss period (1-18 weeks) was 14,97 kg which it was within the expected range of weight loss (9-18 kg). The mean weight of the intervention group for males of this age group for the first week was 101.10kg (SD ±9.14) . The mean weight for the intervention group for the 18th week was 86kg (SD ±8.33).

Furthermore, the mean difference (decrease) of the waist circumference (WC) for the first 18 weeks was 14,55 cm. The mean WC at the 18th week was 93.40 cm (±5.21). Waist circumference was more normally distributed among the healthier men and women than in the full sample. The values of 102 cm for men and 88 cm for women, recommended as

cutoff points by National Heart Lung and Blood Institute (NHLBI), corresponded fairly closely to the 95th percentile of waist circumference for healthy people, indicating that few healthy people will have values above these cutoffs. The lower action level values of 94 cm for men and 80 cm for women were more sensitive than the NHLBI cutoff values and correspondingly less specific. The overlap of waist circumference values between healthy and unhealthy people was considerable. The difference (decrease) in body fat percentage was 10,10% less, while the actual body fat percentage for the 18 weeks was 27,54% (±7.54) . Although, this was higher than the reference point (8-19%) of the normal body fat for the age group (Gallagher 2000), there was a significant improvement in the decrease of body fat. The mean difference (increase) for the Lean Body Mass percentage (LBM%) was 10,11% higher for the 18 weeks, while the mean for the actual percentage for the LBM was 72,46% (± 7.54) and it was within the normal percentage (>71%LBM). The mean of the difference (increase) for the Body Fluid Intake percentage (TBW%) was 4.66% more, while the actual mean for the 18th week was 45,52% (±2.81). Although, there was an increase on the TBW as it was expected, it was still lower than the normal range (55-60% TBW).

The Basal Metabolic Rate (BMR) was decreased with the weight loss, as it was expected by 205,09 kcal at the 18th week. Factors that affect BMR include genetics, age, weight, gender, external temperature, internal temperature, body surface area, body fat percentage and others. Genetics will affect BMR because the initial metabolic set point is determined by genetics. Some people will have a BMR that is set higher than others, naturally. Age comes into play with BMR because it slows at roughly 2 percent every 10 years after the age of 20. Women have a lower BMR than a man because men usually have a lower percentage of body fat and a higher percentage of muscle, meaning that men require a higher metabolism to maintain this muscle. The external temperature can be responsible for raising BMR. If the weather is cold, the body must create more heat to keep warm. Body surface area is also relevant to BMR. Height and weight help determine BMR. The higher body surface area is, the higher the BMR. Body fat percentage also affects BMR. The higher the body fat percentage the lower the BMR. Lean muscle raises BMR and body fat lowers it. Certain glands in the body are responsible for regulating and setting

BMR, including the thyroid and adrenal glands (Expert Panel on the Identification, Evaluation and Treatment of Overweight in Adults 1998). The mean difference of the Body Mass Index (BMI) at the 18th week was 4,87 less. The mean BMI value for the 18th week was 28,02 (±2,51), which although it had a considerable decrease from the initial, it did not reach the expected normal range (20-25). In all cases there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005)

Table 28b. Progress chart for intervention group for weeks 19-36: Males 18-25 y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	19	20	85,42	-1,04	8,39	0.698
	36	20	84,38		8,43	
WC	19	20	92,45	-2,75	5,09	0.083
	36	20	89,70		4,65	
BF	19	20	26,72	-1,87	7,91	0.489
	36	20	24,85		9,00	
LBM (%)	19	20	73,28	1,87	7,91	0.489
	36	20	75,16		9,00	
TBW(%)	19	20	45,79	0,39	2,80	0.660
	36	20	46,18		2,72	
BMR	19	20	1960,00	-14,25	119,92	0.713
	36	20	1945,76		123,12	
BMI	19	20	27,79	-0,35	2,49	0.652
	36	20	27,44		2,38	

For the age group 18-25 for males for the maintenance period (19-36 weeks) from the intervention (see **table 28b**), the group that had underwent behaviour modification therapy for weight management the results were as follows: the sample size of this group represented 11,36% of the intervention group and 5,93% of the total group. Although during this period the intervention group was not expected to lose weight and to decrease the WC, BF, the BMR and the BMI, and increase the LBM and the TBW, this age group 18-25 had differences for these parameters. Specifically, the mean weight loss for the maintenance period (20-36 weeks) was 1,04 kg. Furthermore, the mean difference (decrease) of the waist circumference (WC) for the 19-36 weeks was 2,75 cm. The lower

action level values (National Heart Lung and Blood Institute (NHLBI, 1998) of 94 cm for men was achieved. The difference in body fat percentage was 1,87 lower, while the actual body fat percentage for the 36 weeks was 24,85% (±9.0) which can be considered close to the reference point of 8-19% expected body fat for the age group (Gallagher, 2000). The mean difference (increase) for the Lean Body Mass percentage (LBM%) was 1.87% for the 36 weeks, while the mean for the actual percentage for the LBM was 75,16% (± 9.0) and it was within the normal percentage (>71%LBM). The mean of the difference (increase) for the Body Fluid Intake percentage (TBW%) was 0.39% , while the actual mean for the 36th week was 46,18% (±2.72). Although, there was an increase in the TBW, it was lower than the normal range (55-60% TBW). As it was expected, the Basal Metabolic Rate (BMR) was decreased with the weight loss by 14,25 kcal at the 36th week. The mean difference (decrease) of the Body Mass Index (BMI) at the 36th week was 0,35. The mean BMI value for the 36th week was 27,44 (±2,38), which it had a minimal change from the 20th week, it did not reach the expected normal range (20-25).
In all cases there is enough statistical evidence to say that there is not any difference in the means (p-value > 0.005)

Table 29a. Progress chart for intervention group for weeks 1-18: Males 25-40 y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	35	100,8229	-12,37	13,83984	0.000
	18	35	88,4543		13,70709	
WC	1	35	111,8571	-13,14	9,65932	0.000
	18	35	98,7143		9,95747	
BF	1	35	40,8743	-8,18	6,36608	0.000
	18	35	32,6914		7,96955	
LBM (%)	1	35	59,1257	8,18	6,36608	0.000
	18	35	67,3086		7,96955	
TBW(%)	1	35	49,4174	-4,85	50,58814	0.573
	18	35	44,5671		3,55871	
BMR	1	35	2101,9131	-169,59	214,42934	0.001
	18	35	1932,3209		210,89957	
BMI	1	35	32,1983	-3,95	3,77040	0.000
	18	35	28,2443		3,75064	

Regarding the age group 25-40 for males from the intervention group (**table 26a**), the group that had underwent behaviour modification therapy for weight management and the results were as follows: the sample size of this group represented 19.8% of the intervention group and 10,4% of the total group. The mean weight loss for the weight loss period (1-18 weeks) was 12,37 kg which was within the expected range of weight loss (9-18kg). Furthermore, the mean difference (decrease) of the waist circumference (WC) for the first 18 weeks was 13,14 cm. The mean WC at the 18th week was 98,7 cm (±9.96). Waist circumference was more normally distributed among the healthier men and women than in the full sample. The values of 102 cm for men and 88 cm for women, recommended as cutoff points by National Heart Lung and Blood Institute (NHLBI 1998), corresponded fairly closely to the 95th percentile of waist circumference for healthy people, indicating that few healthy people will have values above these cutoffs. The lower action level values of 94 cm for men and 80 cm for women were more sensitive than the NHLBI cutoff values and correspondingly less specific. The overlap of waist circumference values between healthy and unhealthy people was considerable. The

difference (decrease) in body fat percentage was 8,18%, while the actual average body fat percentage for the 18 weeks was 32.89% (±7,97). Although, this was higher than the reference point (8-19%) of the normal body fat for the age group (Gallagher 2000), there was a significant improvement in the body fat percentage. The mean difference for the Lean Body Mass percentage (LBM%) was 8,18% higher for the 18 weeks, while the mean for the actual percentage for the LBM was 67.30% (±7.97) and it was within the normal percentage (>71%LBM). The mean of the difference (increase) for the Body Fluid Intake percentage (TBW%) was 4,85% more, while the actual mean for the 18th week was 44,56% (±3,56). Although, there was an increase on the BFl as was expected, it was lower than the normal range (55-60% TBW). The Basal Metabolic Rate (BMR) was decreased with the weight loss as was expected by 169,59 kcal at the 18th week. The mean difference of the Body Mass Index (BMI) at the 18th week was 3,95 less. The mean BMI value for the 18th week was 28,24 (±3,75), which although there was it had a considerable decrease from the initial, it did not reach the normal range (20-25).

In the cases of weight, WC, TBW (%) and BMI there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005).

Table 29b. Progress chart for intervention group for weeks 19-36: Males 25-40 y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	19	35	87,3743	-1,30	11,94203	0,643
	36	35	86,0771		11,33532	
WC	19	35	98,0000	-1,66	9,70446	0,466
	36	35	96,3429		9,21936	
BF	19	35	33,0346	-0,13	8,05982	0,950
	36	35	32,9094		8,47166	
LBM (%)	19	35	66,9654	0,13	8,05982	0,950
	36	35	67,0906		8,47166	
TBW(%)	19	35	44,8403	0,43	3,27289	0,581
	36	35	45,2709		3,21766	
BMR	19	35	1917,5249	-17,77	189,55714	0,690
	36	35	1899,7540		180,91575	
BMI	19	35	27,9037	-0,40	3,16961	0,600
	36	35	27,5074		3,12179	

For the male group 25-40 aged for the maintenance period (19-36 weeks) (table **29b**) from the intervention for the group that had undergone behaviour modification therapy for weight management and the results were as follows: the sample size of this group represented 19.8% of the intervention group and 10.3% of the total group. Although during this period the intervention group was not expected to lose weight and to decrease the WC, the BF, BMR and the BMI, and increase the LBM and the TBW this age group 25-40 had differences for these parameters. Specifically, the mean weight loss for the maintenance period (20-36 weeks) was 1,30 kg. Furthermore, the mean difference (decrease) of the waist circumference (WC) for the 20-36 weeks was 1,66 cm. The lower action level values National Heart Lung and Blood Institute (NHLBI 1998) of 94 cm for men was achieved. The difference in body fat percentage was 0.33% (decrease), while the actual body fat percentage for the 36 weeks was 32,9% (±8,47). Although, this

was higher than the reference point (8-19%) of the normal body fat for the age group (Gallagher 2000), there was a significant improvement in the decrease of body fat. The mean difference (increase) for the Lean Body Mass percentage (LBM%) was 0,13% for the 36 weeks, while the mean for the actual percentage for the LBM was 67,09% (± 8.47) and it was within the normal percentage (>71%LBM). The mean of the difference (increase) for the Body Fluid Intake percentage (TBW%) was 0.43% , while the actual mean for the 36th week was 45,27% (±3,22). Although, there was an increase in the BFl, it was lower than the normal range (55-60% TBW). As was expected, the Basal Metabolic Rate (BMR) decreased with the weight loss by 17,77 kcal at the 36th week. The mean difference of the Body Mass Index (BMI) at the 36th week was 0.40. The mean BMI value for the 36th week was 25,51 (±0,40), which had a minimal change from the 19th week. However, it is borderline to the upper level of the expected normal range (20-25).

In all cases there is enough statistical evidence to say that there is not any difference in the means (p-value > 0.005)

Table 30a. Progress chart for intervention group for weeks 1-18: Males 40-51 y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	20	95,8050	-12,34	12,10883	0,001
	18	20	83,4700		9,63175	
WC	1	20	109,7500	-13,25	7,68371	0,000
	18	20	96,5000		5,68701	
BF	1	20	35,4145	-7,57	7,72650	0,003
	18	20	27,8470		7,58524	
LBM (%)	1	20	64,5855	7,57	7,72650	0,003
	18	20	72,1530		7,58524	
TBW(%)	1	20	40,7255	3,89	2,58728	0,000
	18	20	44,6130		2,96901	
BMR	1	20	1941,7985	-168,99	189,42838	0,004
	18	20	1772,8090		155,92111	
BMI	1	20	31,1315	-3,99	3,30241	0,000
	18	20	27,1445		2,77163	

For the male group aged 40-51 from the intervention group for the group (**table 30a**) that had underwent behaviour modification therapy for weight management with the following results: the sample size of this group represented 11.36% of the intervention group and 5,93% of the total group. The mean weight loss for the weight loss period (1-18 weeks) was 12,34 kg which was within the expected range of weight loss (9-18kg). Furthermore, the mean difference (decrease) of the waist circumference (WC) for the first 18 weeks was -13,25 cm. The mean WC at the 18th week was 96.50 cm (±5.68). Waist circumference was more normally distributed among the healthier men and women than in the full sample. The values of 102 cm for men and 88 cm for women, recommended as cutoff points by National Heart Lung and Blood Institute (NHLBI), corresponded fairly

closely to the 95th percentile of waist circumference for healthy people, indicating that few healthy people will have values above these cutoffs. The lower action level values of 94 cm for men and 80 cm for women were more sensitive than the NHLBI cutoff values and correspondingly less specific. The overlap of waist circumference values between healthy and unhealthy people was considerable. The difference (decrease) in body fat percentage was 7,57%, while the actual body fat percentage for the 18 weeks was 27,85% (±7.59) which can be considered close to the reference point of 11-22% expected body fat for the age group (Gallagher, 2000). The mean difference (increase) for the Lean Body Mass percentage (LBM%) was 7,57% for the 18 weeks, while the mean for the actual percentage for the LBM was 72,15% (±7.59) and was within the normal percentage (>71%LBM). The mean of the difference (increase) for the Body Fluid Intake percentage (TBW%) was 3.89%, while the actual mean for the 18th week was 44.61% (±2.97). Although there was an increase in the BFl as was expected, it was lower than the normal range (55-60% TBW). The Basal Metabolic Rate (BMR) was decreased with the weight loss as it was expected by 168,99 kcal at the 18th week. The mean difference of the Body Mass Index (BMI) at the 18th week was 3,99 less. The mean BMI value for the 18th week was 27.14 (±2.77), which although it had a considerable decrease from the initial, it did not reach the expected normal range (20-25). In all cases there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005).

Table 30b. Progress chart for intervention group for weeks 19-36: Males 40-51 y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	19	20	83,0850	-0,67	9,08308	0,811
	36	20	82,4150		8,54106	
WC	19	20	95,5000	-2,15	5,40468	0,196
	36	20	93,3500		4,91266	
BF	19	20	27,8280	-1,88	8,00043	0,509
	36	20	25,9435		9,79800	
LBM (%)	19	20	72,1720	1,88	8,00043	0,509
	36	20	74,0565		9,79800	
TBW(%)	19	20	44,7250	0,23	2,86489	0,800
	36	20	44,9535		2,81375	
BMR	19	20	1767,5345	-9,18	148,69200	0,842
	36	20	1758,3555		140,44047	
BMI	19	20	27,0235	-0,21	2,63860	0,797
	36	20	26,8110		2,54190	

Regarding the age group 40-51 for males for the maintenance period (19-36 weeks) (**table 30b**) from the intervention, the group that had undergone behaviour modification therapy for weight management and the results were as follows: the sample size of this group represented 11,36% of the intervention group and 5,93% of the total group. Although during this period the intervention group was not expected to lose weight and to decrease the WC, the BF, the BMR and the BMI and increase the LBM and the TBW, this age group 18-25 had differences for these parameters. Specifically, the mean weight loss for the maintenance period (20-36 weeks) was 0,67 kg. Furthermore, the mean difference of (decrease) the waist circumference (WC) for the 20-36 weeks was 2,15 cm.

The lower action level values (National Heart Lung and Blood Institute (NHLBI 2002) of 94 cm for men was achieved. The difference in body fat percentage was 1,88% lower, while the actual body fat percentage for the 36 weeks was 25,94 % (±9.79) which can be considered close to the reference point of 11-22% expected body fat for the age group (Gallagher 2000). The mean difference (increase) for the Lean Body Mass percentage (LBM%) was 1,88 % for the 36 weeks, while the mean for the actual percentage for the LBM was 74.06% (± 9,79) and was within the normal percentage (>71%LBM). The mean of the difference (increase) for the Body Fluid Intake percentage (TBW%) was 0.23% , while the actual mean for the 36th week was 44.95% (±2.81). Although, there was an increase in the BFl, it was lower than the normal range (55-60% TBW). As was expected, the Basal Metabolic Rate (BMR) decreased with the weight loss by 9,18 kcal at the 36th week. The mean difference (decrease) of the Body Mass Index (BMI) at the 36th week was 0,21. The mean BMI value for the 36th week was 26,81 (±2.54), which had a minimal change from the 19th week, it did not reach the expected normal range (20-25).
In all cases there is enough statistical evidence to say that there is not any difference in the means (p-value > 0.005).

Table 31a. Progress chart for intervention group for weeks 1-18: Females 18-25y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	23	79,5087	-13,12	10,85880	0,000
	18	23	66,3913		9,92581	
WC	1	23	95,6522	-13,26	12,09661	0,000
	18	23	82,3913		11,80423	
BF	1	23	41,6130	-9,28	7,70439	0,000
	18	23	32,3330		6,04852	
LBM (%)	1	23	58,3870	9,28	7,70439	0,000
	18	23	67,6670		6,04852	
TBW(%)	1	23	37,4939	4,73	2,83532	0,000
	18	23	42,2191		3,91556	
BMR	1	23	1612,6835	-125,93	109,77641	0,000
	18	23	1486,7565		100,14062	
BMI	1	23	29,8091	-4,91	3,43619	0,000
	18	23	24,9013		3,37444	

For the age group 18-25 for females from the intervention group for the group (**table 31a**) that had undergone behaviour modification therapy for weight management and the results were as follows: the sample size of this group represented 13.06.% of the intervention group and 6,82% of the total group. The mean weight loss for the weight loss period (1-18 weeks) was 13,12 kg which was within the expected range of weight loss (9-18kg). The mean weight of the intervention group for the females of this age group for the first week was 79.50kg (SD ± 10.50) kg. The mean weight for the intervention group for the 18th week was 66.39kg (SD ±9.93).

Furthermore, the mean difference (decrease) of the waist circumference (WC) for the first 18 weeks was 13,26 cm. The mean WC at the 18th week was 82,39cm (±11,80). Waist circumference was more normally distributed among the healthier men and women than

in the full sample. The values of 102 cm for men and 88 cm for women, recommended as cutoff points by National Heart Lung and Blood Institute (NHLBI 1998), corresponded fairly closely to the 95th percentile of waist circumference for healthy people, indicating that few healthy people will have values above these cutoffs. The lower action level values of 94cm for men and 80cm for women were more sensitive than the NHLBI cutoff values and correspondingly less specific. The overlap of waist circumference values between healthy and unhealthy people was considerable. The difference (decrease) in body fat percentage was 9,28%, while the actual body fat percentage for the 18 weeks was 32.33% (±6,04) which is considered within the reference point of 21-33% expected body fat for the age group (Gallagher 2000). The mean difference (increase) for the Lean Body Mass percentage (LBM%) was 9,28% for the 18 weeks, while the mean for the actual percentage for the LBM was 67.67% (±6,04) and was within the normal percentage (>71%LBM). The mean of the difference (increase) for the Body Fluid Intake percentage (TBW%) was 4.73%, while the actual mean for the 18th week was 42,21% (±3,92). Although, there was an increase in the BFl, it was still lower than the normal range (55-60% TBW). The Basal Metabolic Rate (BMR) decreased with the weight loss as was expected by 125.93 kcal at the 18th week. The mean difference of the Body Mass Index (BMI) at the 18th week was 4,91. The mean BMI value for the 18th week was 24,90 (±3.37), which was within the expected normal range (20-25). In the cases of weight, WC, TBW (%), BMR and BMI there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005).

Table 31b. Progress chart for intervention group for weeks 19-36: Females 18-25 y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	19	23	66,0000	-1,57	9,71058	0,568
	36	23	64,4348		8,71167	
WC	19	23	81,5870	-3,24	11,56469	0,316
	36	23	78,3478		10,01639	
BF	19	23	31,6683	-2,48	5,29376	0,127
	36	23	29,1913		5,50334	
LBM (%)	19	23	68,3317	2,48	5,29376	0,127
	36	23	70,8087		5,50334	
TBW(%)	19	23	42,3661	0,58	3,85305	0,596
	36	23	42,9452		3,48970	
BMR	19	23	1483,0000	-15,03	98,08257	0,588
	36	23	1467,9739		88,61512	
BMI	19	23	24,7530	-0,59	3,28023	0,517
	36	23	24,1630		2,82211	

For the female group aged 18-25 for the maintenance period (19-36 weeks) **(table 31b)** from the intervention for the group that had undergone behaviour modification therapy for weight management and the results were as follows: the sample size of this group represented 13.06% of the intervention group and 6,82% of the total group. Although during this period the intervention group was not expected to lose weight and to decrease the WC, the BF, the BMR and the BMI, and increase the LBM and the TBW, this age group 18-25 had small differences for these parameters. Specifically, the mean weight loss for the maintenance period (19-36 weeks) was 1,57 kg. Furthermore, the mean difference (decrease) of the waist circumference (WC) for the 20-36 weeks was 3,24 cm. The lower action level values (National Heart Lung and Blood Institute (NHLBI 1998) of 94 cm for men was achieved. The difference in body fat percentage was 2,48 % lower,

while the actual body fat percentage for the 36 weeks was 29.19% (±5,50) which is considered within the reference point of 21-33% expected body fat for the age group (Gallagher 2000). The mean difference (increase) for the Lean Body Mass percentage (LBM%) was 2.48% for the 36 weeks, while the mean for the actual percentage for the LBM was 70.81% (± 5,50) and was within the normal percentage (>71%LBM). The mean of the difference (increase) for the Body Fluid Intake percentage (TBW%) was 0.58%, while the actual mean for the 36th week was 42,95% (±3.49). Although, there was an increase in the BFl, it was still lower than the normal range (55-60% TBW). As was expected, the Basal Metabolic Rate (BMR) decreased with the weight loss by 15,03 kcal at the 36th week. The mean difference (decrease) of the Body Mass Index (BMI) at the 36th week was 0,59. The mean BMI value for the 36th week was 24,16 (±2,82), which had a minimal change from the 20th week, reached the expected normal range (20-25). In all cases there is enough statistical evidence to say that there is not any difference in the means (p-value > 0.005).

Table 32a. Progress chart for intervention group for weeks 1-18: Females 25-40 y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	53	75,7415	-11,76	11,32065	0.000
	18	53	63,9849		9,30840	
WC	1	53	90,6981	-9,91	10,43217	0.000
	18	53	80,7925		10,04386	
BF	1	53	39,3283	-9,06	6,77808	0.000
	18	53	30,2700		7,02798	
LBM (%)	1	53	60,6717	9,06	6,77808	0.000
	18	53	69,7300		7,02798	
TBW(%)	1	53	37,2253	4,22	3,93599	0.000
	18	53	41,4411		4,71212	
BMR	1	53	1512,3298	-112,95	105,81750	0.000
	18	53	1399,3777		86,54910	
BMI	1	53	29,0092	-4,49	4,92022	0.000
	18	53	24,5145		4,09565	

As for the female group aged 25-40 from the intervention group for the group (**table 32a**) that had undergone behaviour modification therapy for weight management and the results were as followed: the sample size of this group represented 30,11% of the intervention group and 15,7% of the total group. The mean weight loss for the weight loss period (1-18 weeks) was 11,76 kg which was within the expected range of weight loss (9-18 kg). Furthermore, the mean difference (decrease) of the waist circumference (WC) for the first 18 weeks was 9,91 cm. The mean WC at the 18th week was 80,79 cm (±10,04). Waist circumference was more normally distributed among the healthier men and women than in the full sample. The values of 102 cm for men and 88 cm for women, recommended as cutoff point by the (National Heart Lung and Blood Institute (NHLBI 1998), corresponded fairly closely to the 95th percentile of waist circumference for

healthy people, indicating that few healthy people will have value above these cutoffs. The lower action level values of 94 cm for men and 80 cm for women were more sensitive than the NHLBI cutoff values and correspondingly less specific. The overlap of waist circumference values between healthy and unhealthy people was considerable. The difference (decrease) in body fat percentage was 9,06 % less, while the actual body fat percentage for the 18 weeks was 30,27 % (±7.03) which is considered within the reference point of 21-33% expected body fat for the age group (Gallagher, 2000). The mean difference (increase) for the Lean Body Mass percentage (LBM%) was 9,06 % for the 18 weeks, while the mean for the actual percentage for the LBM was 69,73 % (±7.03) and it was within the normal percentage (>71%LBM). The mean of the difference (increase) for the Body Fluid Intake percentage (TBW%) was 4,22%, while the actual mean for the 18th week was 41,44 % (±4,71). Although there was an increase in the BFl as was expected, it was still lower than the normal range (55-60% TBW). The Basal Metabolic Rate (BMR) decreased with the weight loss as was expected by 112.95 kcal at the 18th week. The mean decrease in the Body Mass Index (BMI) at the 18th week was 4,49. The mean BMI value for the 18th week was 24.51 (±4.09), which is considered within the expected normal range (20-25). In all cases there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005).

Table 32b. Progress chart for intervention group for weeks 19-36: Females 25-40 y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	19	53	63,6000	-1,40	8,91129	0,389
	36	53	62,1981		7,72968	
WC	19	53	79,8868	-2,06	9,05254	0,239
	36	53	77,8302		8,80720	
BF	19	53	30,4630	-2,93	7,20283	0,038
	36	53	27,5321		7,13695	
LBM (%)	19	53	69,5370	2,93	7,20283	0,038
	36	53	72,4679		7,13695	
TBW(%)	19	53	41,5696	0,51	4,63912	0,566
	36	53	42,0755		4,39372	
BMR	19	53	1395,6826	-13,46	83,00069	0,374
	36	53	1382,2245		71,71962	
BMI	19	53	24,3743	-0,53	4,00805	0,475
	36	53	23,8411		3,63214	

For the age group 25-40 for females for the maintenance period (20-36 weeks) from the intervention for the group that had underwent behaviour modification therapy for weight management and the results were as follows: the sample size of this group represented 30,11% of the intervention group and 15,72% of the total group. Although during this period the intervention group was not expected to lose weight and to decrease the WC, the BF, the BMR, and the BMI, and increase the LBM and the TBW this age group 25-40 had small differences for these parameters. Specifically, the mean weight loss for the maintenance period (20-36 weeks) was 1.40 kg. Furthermore, the mean difference (decrease) in the waist circumference (WC) for the 20-36 weeks was 2,06 cm. The lower action level values (National Heart Lung and Blood Institute (NHLBI 1998) of 94cm for men was achieved. The difference in body fat percentage was 2,93 % lower, while the

actual body fat percentage for the 36 weeks was 27,53% (±7,14) which is considered within the reference point of 21-33% expected body fat for the age group (Gallagher 2000). The mean difference (increase) for the Lean Body Mass percentage (LBM%) was 2,93% for the 36 weeks, while the mean for the actual percentage for the LBM was 72,47% (± 7,14) and was within the normal percentage (>71%LBM). The mean of the difference (increase) for the Body Fluid Intake percentage (TBW%) was 0.51% , while the actual mean for the 36th week was 42.08% (±4.39). Although, there was an increase in the BFl, it was still lower than the normal range (55-60% TBW). As was expected, the Basal Metabolic Rate (BMR) was decreased with the weight loss by 13,46 kcal at the 36th week. The mean difference (decrease) of the Body Mass Index (BMI) at the 36th week was 0,53. The mean BMI value for the 36th week was 23,84 (±3.63), which is within the normal range (20-25). In all cases there is enough statistical evidence to say that there is not any difference in the means (p-value > 0.005).

Table 33a. Progress chart for intervention group for weeks 1-18: Females 40-51 y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	25	79,2640	-11,89	9,70790	0.000
	18	25	67,3720		9,13362	
WC	1	25	94,9600	-10,54	7,51931	0.000
	18	25	84,4200		8,75914	
BF	1	25	42,0748	-9,15	5,16213	0.000
	18	25	32,9288		5,66755	
LBM (%)	1	25	57,9252	9,15	5,16213	0.000
	18	25	67,0712		5,66755	
TBW(%)	1	25	34,2560	3,59	2,98562	0.000
	18	25	37,8508		3,69466	
BMR	1	25	1485,7424	-114,16	97,09370	0.000
	18	25	1371,5792		93,55055	
BMI	1	25	31,2544	-4,71	4,47544	0.000
	18	25	26,5424		3,89676	

For the age group 40-51 for females from the intervention group for the group (**table 33a**) that had undergone behaviour modification therapy for weight management and the results were as follows: the sample size of this group represented 14.2% of the intervention group and 7,4% of the total group. The mean weight loss for the weight loss period (1-18 weeks) was 11,89 kg which was within the expected range of weight loss (9-18kg). Furthermore, the mean difference (decrease) of the waist circumference (WC) for the first 18 weeks was 10,54 cm. The mean WC at the 18th week was 84,42 cm (±8,76). Waist circumference was more normally distributed among the healthier men and women than in the full sample. The values of 102 cm for men of 88cm for women, recommended as cutoff points by National Heart Lung and Blood Institute (NHLBI), corresponded fairly closely to the 95th percentile of waist circumference for healthy

people, indicating that few healthy people will have values above these cutoffs. The lower action level value of 94 cm for men and 80 cm for women was more sensitive than the NHLBI cutoff values and correspondingly less specific. The overlap of waist circumference values between healthy and unhealthy people was considerable. The difference (decrease) in body fat percentage was 9,15% , while the actual body fat percentage for the 18 weeks was 32,93% (±5,67) which can be considered close to the reference point of 23-35% expected body fat for the age group (Gallanger 2000). The mean difference (increase) for the Lean Body Mass percentage (LBM%) was 9,15% higher for the 18 weeks, while the mean for the actual percentage for the LBM was 67,07% (±5,67) and it was within the normal percentage (>71%LBM). The mean of the difference (increase) for the Body Fluid Intake percentage (TBW%) was 3.59% more, while the actual mean for the 18th week was 37.85% (±3,69). Although, there was an increase in the BFl, it was still lower than the normal range (55-60% TBW). The Basal Metabolic Rate (BMR) decreased with the weight loss as was expected, by 114,16 kcal at the 18th week. The mean difference of the Body Mass Index (BMI) at the 18th week was 4,71 less. The mean BMI value for the 18th week was 26,54 (±3,89), and although it had a considerable decrease from the initial, it did not reach the expected normal range (20-25). In all cases (except LBM (%)) there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005).

Table 33b. Progress chart for intervention group for weeks 20-36: Females 40-51 y.o.

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	26	66,5885	-1,42	9,07847	0.557
	36	25	65,1640		8,06453	
WC	20	26	83,2500	-1,61	8,24773	0.480
	36	25	81,6400		7,89451	
BF	20	26	32,3277	-1,71	6,68914	0.387
	36	25	30,6136		7,34429	
LBM (%)	20	26	67,6723	1,71	6,68914	0.387
	36	25	69,3864		7,34429	
TBW(%)	20	26	38,1900	0,41	3,77455	0.698
	36	25	38,5952		3,64202	
BMR	20	26	1365,4685	-15,09	91,47278	0.539
	36	25	1350,3824		82,29160	
BMI	20	26	26,2169	-0,52	3,91391	0.625
	36	25	25,6936		3,67781	

For the age group 40-51 for females for the maintenance period (20-36 weeks) (t**able 33b**) from the intervention for the group that had undergone underwent behaviour modification therapy for weight management the results were as follows: the sample size of this group represented 14,77% of the intervention group and 7,41% of the total group. Although during this period the intervention group was not expected to lose weight and to decrease the WC, the BF and the BMR and the BMI, and increase the LBM and the BFl this age group 40-51 had small differences for these parameters. Specifically, the mean weight loss for the maintenance period (20-36 weeks) was 1,42 kg. Furthermore, the mean difference of the waist circumference (WC) for the 20-36 weeks was -1,61 cm. The lower action level values (National Heart Lung and Blood Institute (NHLBI 1998) of

94cm for men was achieved. The difference in body fat percentage was 1,71 % lower, while the actual body fat percentage for the 36 weeks was 30,61 % (±7,34) which can be considered close to the reference point of 23-35% expected body fat for the age group (Gallagher 2000). The mean difference (increase) for the Lean Body Mass percentage (LBM%) was 1,71% for the 36 weeks, while the mean for the actual percentage for the LBM was 69,39% (± 7,34) and was within the normal percentage (>71%LBM). The mean of the difference for the Body Fluid Intake percentage (TBW%) was 0.41% , while the actual mean for the 36th week was 38,6% (±3.64). Although, there was an increase in the BFl, it was still lower than the normal range (55-60% TBW). As was expected, the Basal Metabolic Rate (BMR) decreased with the weight loss by 15,09 kcal at the 36th week. The mean difference of the Body Mass Index (BMI) at the 36th week was 0,52. The mean BMI value for the 36th week was 25,69 (±3,68), which had a minimal change from the 19th week, did not reach the expected normal range (20-25). In all cases there is enough statistical evidence to say that there is not any difference in the means (p-value > 0.005).

PROGRESS CHART analysis of results of intervention and control groups (for all subjects)

Table 34a Control Group

ALL MALES AND FEMALES
ALL AGE GROUPS
CONTROL GROUP
(no Behaviour Modification)
1—18 Weeks

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	145	86,8421	-5,56	15,41322	0,002
	18	145	81,2793		15,17165	
WC	1	145	100,7517	-5,68	14,68821	0,002
	18	145	95,0690		15,50836	
BF	1	145	40,3222	-0,18	8,57718	0,865
	18	145	40,1441		9,17603	
LBM (%)	1	145	59,6778	0,18	8,57718	0,865
	18	145	59,8559		9,17603	
TBW(%)	1	145	37,3418	1,62	4,63413	0,004
	18	145	38,9602		4,88144	
BMR	1	145	1722,3543	-59,86	256,77662	0,045
	18	145	1662,4952		249,09671	
BMI	1	145	31,7613	-2,05	5,20681	0,001
	18	145	29,7141		5,10319	

19—36 Weeks

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	19	145	80,8648	-1,69	15,18661	0,349
	36	145	79,1793		15,43680	
WC	19	145	94,7586	-2,39	15,41251	0,202
	36	145	92,3655		16,46200	
BF	19	145	41,1266	-0,11	9,06874	0,915
	36	145	41,0119		9,31902	
LBM (%)	19	145	58,8734	0,11	9,06874	0,915
	36	145	58,9881		9,31902	
TBW(%)	19	145	39,0828	0,59	4,88856	0,312
	36	145	39,6775		5,10975	
BMR	19	145	1657,8116	-18,31	249,47016	0,533
	36	145	1639,5001		250,28730	
BMI	19	145	29,5601	-0,61	5,09715	0,314
	36	145	28,9472		5,25787	

Table34b. Intervention Group- Behaviour Modification

ALL MALES AND FEMALES
ALL AGE GROUPS
Intervention Group (With Behaviour Modification)
1—18 Weeks

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	192	85,6224	-11,96	16,56515	0,000
	18	192	73,6594		15,06827	
WC	1	192	99,0208	-11,70	13,93176	0,000
	18	192	87,3203		12,45023	
BF	1	192	39,0566	-8,17	7,32518	0,000
	18	192	30,8865		7,37744	
LBM (%)	1	192	60,9434	8,17	7,32518	0,000
	18	192	69,1135		7,37744	
TBW(%)	1	192	40,2956	2,42	2,08735	0,000
	18	192	42,7152		4,47923	
BMR	1	192	1748,3317	-136,70	320,80286	0,000
	18	192	1611,6293		285,89169	
BMI	1	192	30,3081	-4,26	4,48137	0,000
	18	192	26,0437		3,95472	

19—36 Weeks						
Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	19	192	73,0943	-1,27	14,49406	0,384
	36	192	71,8229		14,07434	
WC	19	192	86,4583	-2,04	12,12806	0,095
	36	192	84,4219		11,70779	
BF	19	192	30,8262	-1,38	7,45628	0,085
	36	192	29,4431		8,20970	
LBM (%)	19	192	69,1738	1,38	7,45628	0,085
	36	192	70,5569		8,20970	
TBW(%)	19	192	42,8951	0,45	4,42680	0,313
	36	192	43,3421		4,23885	
BMR	19	192	1604,7982	-14,05	278,85301	0,619
	36	192	1590,7440		274,50952	
BMI	19	192	25,8511	-0,45	3,78894	0,229
	36	192	25,3976		3,59095	

Figure 3. Comparison of BMI progress for study groups

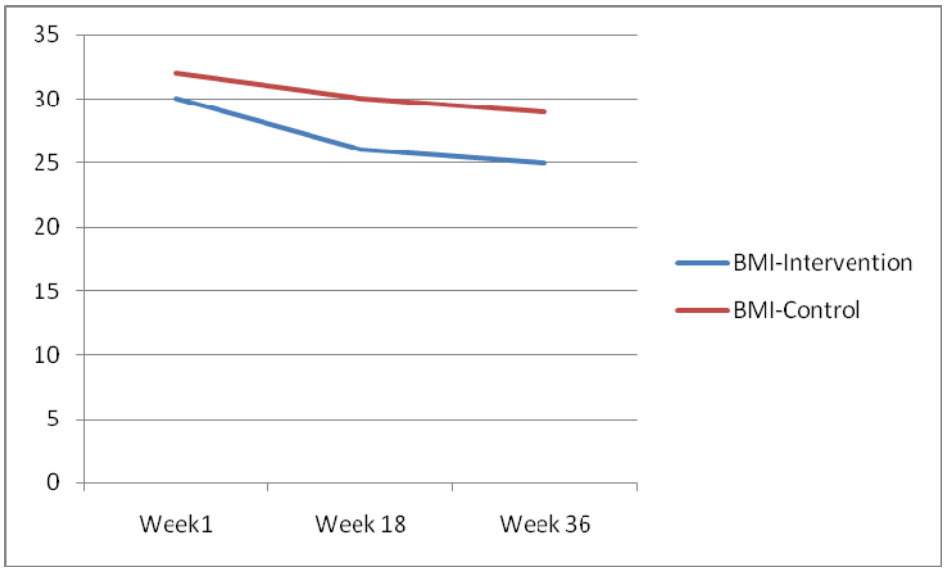


Figure 4. Comparison of BW progress of study groups

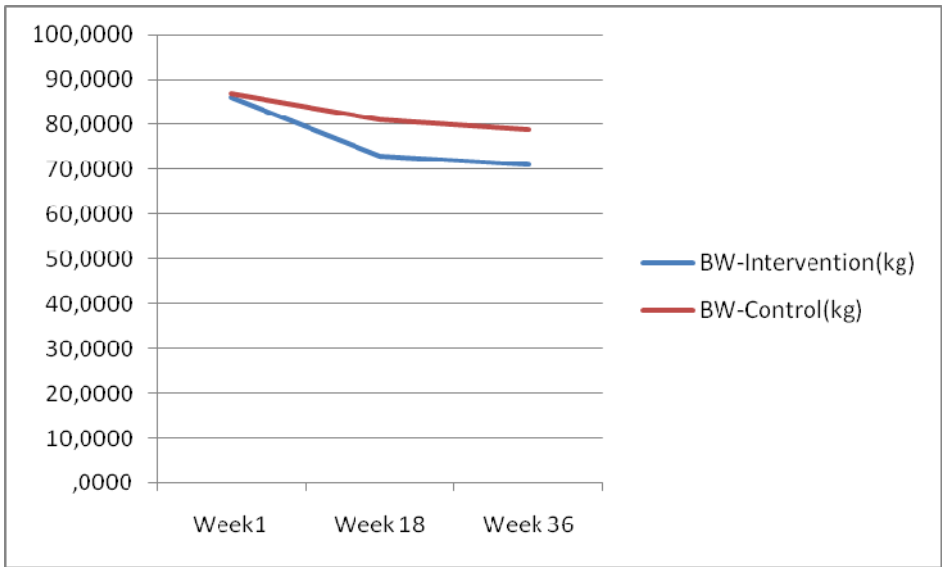


Figure 5. Comparison of WC of study groups 1

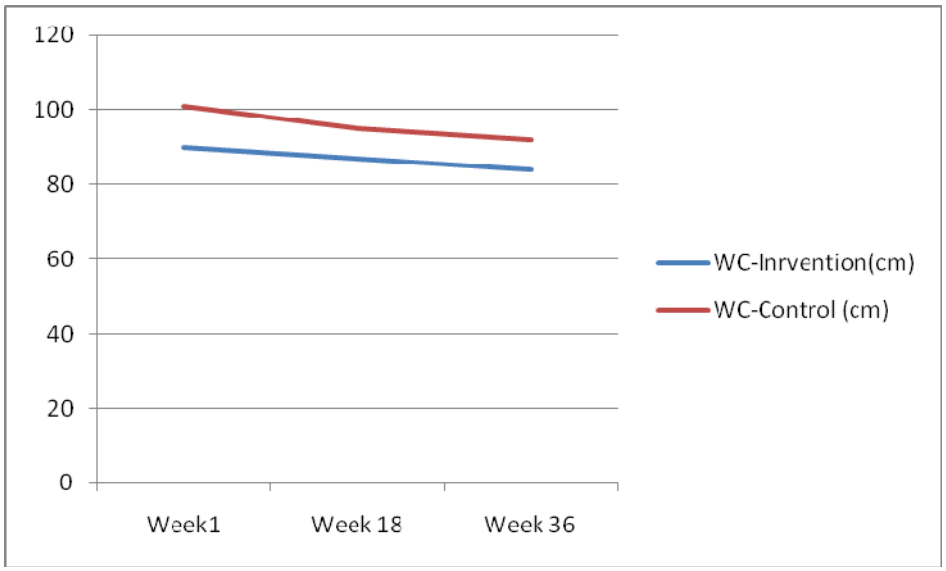
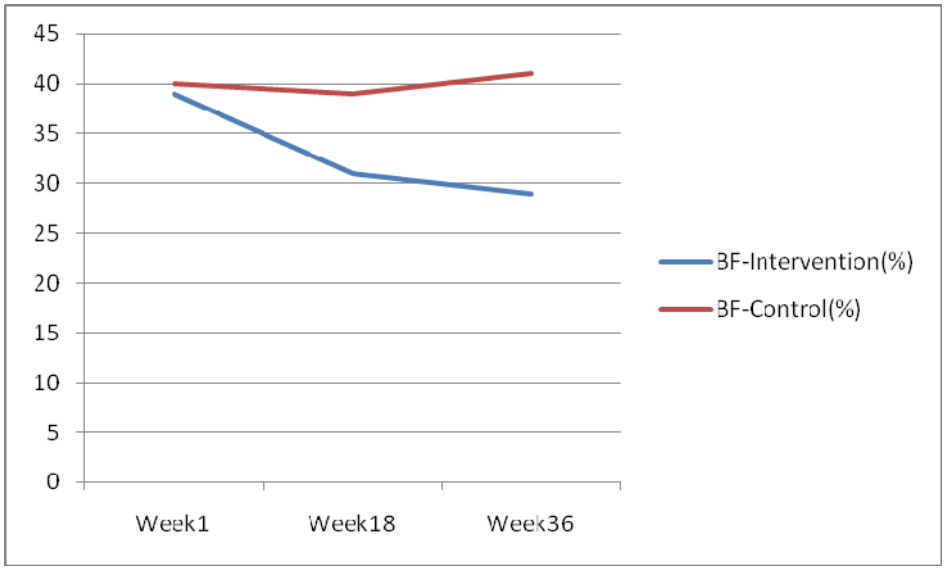


Figure 6. Comparison of BF for study groups



The mean weight of the intervention group (**table 34b**) for all the participants of this group for the first week was 85.62kg (SD± 16.57) kg while the mean weight for the control group (**table 34a**) was 86.84kg (SD± 15.41) . The mean weight for the intervention group for the 18th week was 73.65kg (SD ±15.07) and for the control group was 81.28kg (SD ±15.17). The mean weight for the intervention group for the 36th week was 71.82kg (SD ±14.07) and for the control group was 79.18kg (SD ±15.44). The mean difference for the intervention group for weight was (-11.96kg) (decrease) whereas the control group was only 5.56 kg. The mean difference for weight from the 19th to the 36th week for the intervention group is -1,27 kilos and for the control is - 1,69 kg. In the case of the intervention group for the period 1-18 weeks there is enough statistical evidence to say that there was a difference in the means (p-value < 0.005).

The mean Waist Circumference (WC) of the intervention group for all participants of this group for the first week was 99.02 cm (SD ±13.93) while the mean for the control group was 100.75 cm (SD ±14.69). The mean WC for the intervention group for the 18th week was 87.32cm (SD ±12.45) and for the control group was 95.06 cm (SD ±15.50). The

mean difference of the intervention group for WC was -11.70cm (decrease) whereas the control group was -5.68 cm. The mean difference for the intervention group from the 19th week to the 36th week for WC was -2,04 cm whereas for the control group was -2,39 cm. In the case of the intervention group for the period 1-18 weeks there is enough statistical evidence to say that there is there is enough statistical evidence to say that there was a difference in the means (p-value < 0.005).

The mean body fat of the intervention group for the participants for the first week is 39.06% (SD±7.33) while the mean body fat for the control group is 40.32% (SD±8.58). The mean body fat percent for the intervention group for the 18th week was 30,89% (SD±7.38%) and for the control group was 40.14% (SD±9.18). The mean difference for the intervention group for body fat was -8,17% (decrease)whereas for the control group was -0,18% (decrease). The mean difference for the body fat percent from the 19th week to the 36th for the intervention group was -1,38% (decrease)and for the control group was - 0,11% (decrease). In the case of the intervention group for the period 1-18 weeks there was enough statistical evidence to say that there is there is enough statistical evidence to say that there was a difference in the means (p-value < 0.005).

The mean lean body mass percent (LBM%) of the intervention group for the whole group of behaviour modification therapy for the 1st week was 60.94%(SD ±7.33) while the mean LBM% for the control group was 59.68 (SD ±8.58). The mean LBM percent for the intervention group for the 18th week was 69.11%(SD±7.38) and for the control group was 59.86 (SD ± 9.18). The mean difference for the intervention group for LBM was +8,17% (increase) whereas the control group was +0,18%. The mean difference for the from the 19th to the 36th for LBM percent for the intervention group was 1.28% (increase) and for the control group was +0,11% (increase). In the case of the intervention group for the period 1-18 weeks there was enough statistical evidence to say that there is there is enough statistical evidence to say that there was a difference in the means (p-value < 0.005).

The mean Body Fluid Intake percent (TBW%) of the intervention group for the whole group of behaviour modification therapy for the 1st week was 40.3(SD 44,65% ±2.09) while the mean BFL% for the control group was 37.34% (SD±4.63). The mean LBM percent for the intervention group for the 18th week was 42.72% (SD±4.79) and for the control group was 38.96% (SD ±4.88). The mean difference for the intervention group for LBF was 2.42 (increase) whereas the control group was 1,62%. The mean difference for BFL% from the 19th to the 36th week for the intervention group was 0,457% (increase) and for the control group was0.59 (increase). In the case of the intervention group for the period 1-18 weeks there was enough statistical evidence to say that there is there is enough statistical evidence to say that there was a difference in the means (p-value < 0.005).

The mean Basal Metabolic Rate (BMR) of the intervention group for the whole group of behaviour modification therapy for the 1st week was 1748.33kcal (SD ± 320.8) while the mean for the control group was 1722.35kcal (SD ±256.78). The mean BMR for the intervention group for the 18th week was 1611.63kcal (SD ±285.19) and for the control group was 1662kcal (SD ± 249.1). The mean difference for the intervention group for BMR was -136.70 (decrease) whereas the control group was only -59.65(decrease). The mean difference for the intervention group for BMR from the 19th to the 36th week for the intervention group was -14,05 kcal (decrease) and for the control group was -18.31 kcal. In the case of the intervention group for the period 1-18 weeks there was enough statistical evidence to say that there is there is enough statistical evidence to say that there was a difference in the means (p-value < 0.005).

The mean Body mass Index (BMI) of the intervention group for the whole group of behaviour modification therapy for the 1st week was 30.31(SD ±4.48) while the mean for the control group was 31.76 (SD ± 5.31). The mean BMI for the intervention group for the 18th week was 26.04 (SD ±4.48) and for the control group was 29.71 (SD ±5.10). The mean difference for the intervention group for BMI was -4,26 (decrease) whereas the control group was -2.05 (decrease). The mean difference of the intervention group from the 19th week to the 36th week for BMI was -0,45 (decrease) whereas the control group

was -0,61(decrease). In the case of the intervention group for the period 1-18 weeks there was enough statistical evidence to say that there is there is enough statistical evidence to say that there was a difference in the means (p-value < 0.005).

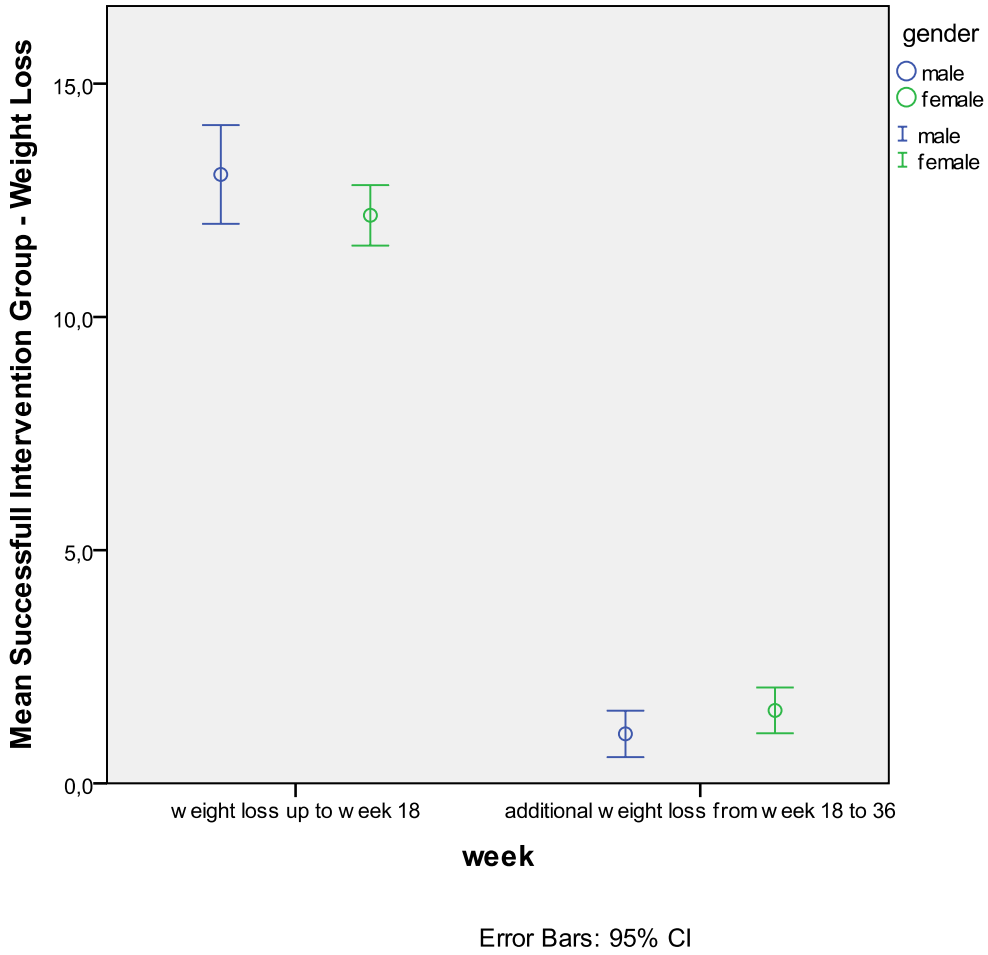
Table 35.

INTERVENTION GROUPS				
	WEIGHT BETWEEN 19TH TO 36TH WEEK			TOTAL
	GAINED	LOST	MAINTAINED	
UNSUCCESSFUL INTERVENTION FEMALE	0	1	9	10
	0%	10%	90%	100%
UNSUCCESSFUL INTERVENTION MALE	0	2	4	6
	0%	33%	67%	100%
UNSUCCESSFUL INTERVENTION TOTAL	**0**	**3**	**13**	**16**
	0%	**19%**	**81%**	**100%**
SUCCESSFUL INTERVENTION FEMALE	2	60	39	101
	2%	59%	39%	100%
SUCCESSFUL INTERVENTION MALE	1	33	41	75
	1%	44%	55%	100%
SUCCESSFUL INTERVENTION TOTAL	**3**	**93**	**80**	**176**
	2%	**53%**	**45%**	**100%**
GRAND TOTAL INTERVENTION GROUP	**3**	**96**	**93**	**192**
	2%	**50%**	**48%**	**100%**

In order to prove completely the hypothesis of the study, the 2/3 of the intervention group with the behaviour modification needed to maintain or continue to lose weight through

the maintenance period (19-36 weeks). **Table 35**, shows the progress of the intervention group, identifies the successful and unsuccessful participants of the group and presents its success rate. From the intervention group- the group which underwent the Behaviour Modification (n=192) only n=16 (8.3% of the total intervention group) were considered to be unsuccessful (did not achieve the weight goal and there was no improvement presented in the evaluation through the checklists) while the n-176 (91.6% of the intervention group) were successful and essentially proved the hypothesis. The 59% of the women and 44% of men of the successful group of the intervention continued to lose weight during the maintenance period whereas 39% of the women and 55% of the men maintained their weight during this period. Only 2% of the female and 1% of the male of the successful group of the intervention gained weight during the maintenance period. From the whole intervention group (n=192) during the 19-36 weeks only 2% (n-3) gained weight, 50% (n=96) continued to lose weight and 48% (93) maintained their weight. Essentially, more than 2/3 managed to maintain/ continue to lose weight during the maintenance period. **Figure 7** shows the progress of successful participants of the intervention group.

Figure 7. Progress of successful participants of the intervention group.



(Note= good is used as a synonym to successful).

Results and Analysis of Checklists

General Correlation explanation

There are various kinds of correlation coefficients that have very small differences between them. It is better to use one correlation coefficient in the same statistical analysis. The Pearson Correlation Coefficient (***R***) is used for this study. By using only one correlation coefficient the results are totally compatible and easily comparable.

The relation between the answers of the responds is called correlation. The correlation coefficient can take all values between -1 and 1 ($-1 < \rho < 1$). Values that are closed to the edging values (-1, 1) are considered to represent high correlation between the variables (questions). When the correlation coefficient equals to 0, means that there is no correlation between the variables.

The positive correlation (between 0 and 1) means that when one variable increases the other increases as well proportionately with the correlation coefficient. Consequently, when there is negative correlation between two variables, it means that when one variable increases then the other one decreases and reversible.

In order to have reliable and strict results, the Pearson correlation coefficient is used at significance level equal to 0,01. This is for the 1% probability where the result might be false. To be more specific, the significance level is the percent which declares that if the same variables (questions) would be analysed 100 times, only one time might give a different correlation coefficient. Thus, the 5% significance level is not so strict and gives more and higher correlations between the variables.

EATING HABITS AND BEHAVIOURAL MODIFICATION RESULTS (CHECKLISTS A& C)

Checklist A

Eating Habits of the Intervention Group (as a whole)

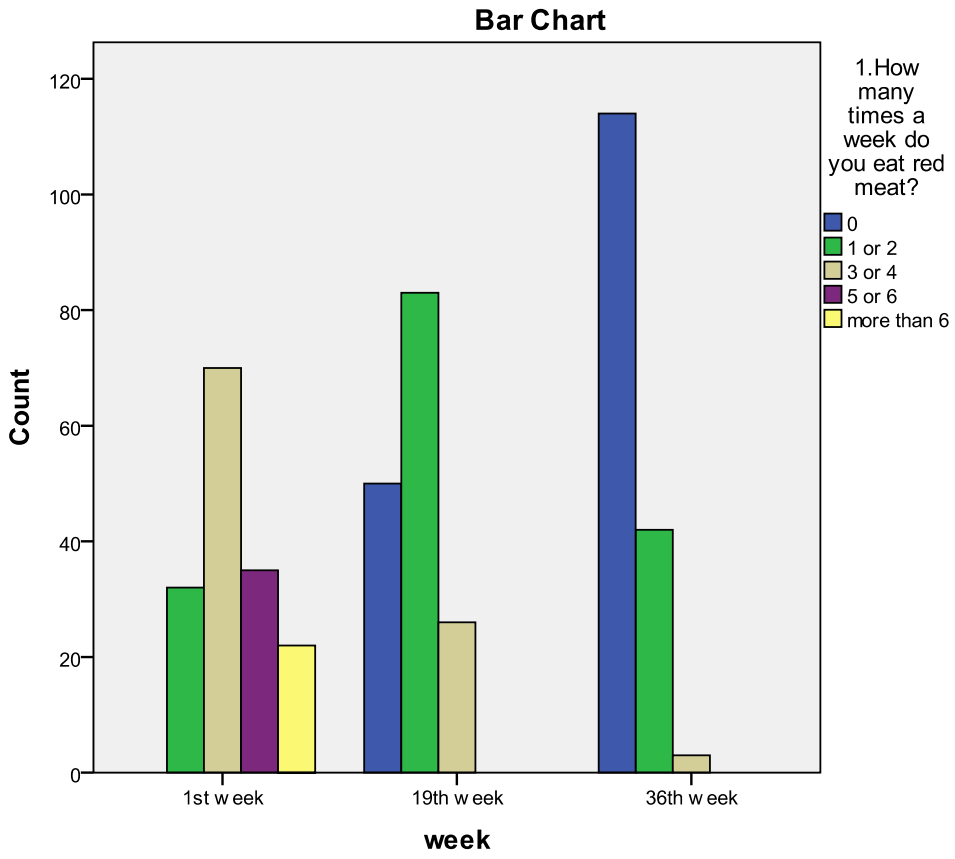
The following sections discuss the results of the checklists on the eating habits of the intervention group only measured at week 1, week 19 and week 36. It was observed that there were significant improvements in the habits of the intervention group as to their food portions, type of food intake etc. For this section, the respondents referred to herein are those who belong to the intervention group. The tables showing the data for this section are located in Appendix 4.

The cross tabulation table below shows the eating behavior changes through the weeks according the consumption of red meat during a week. It is obvious that on the 1st week, the majority of people used to eat red meat more than 3 times a week and in the last week (36th week) the vast majority of people (71,7%) stated that they do not eat red meat at all during the week.

To be more specific, the 1st week, 44% of the sample answered that they eat red meat 3-4 times per week, 22% that they eat 5-6 times a week, 20,1% 1-2 times a week. It is interesting to see that 13,8 they pointed that they eat more than 6 times a week red meat and there were no answers on no eating red meat during a week (0%). When starting the maintenance program (19th week), 34,4% stated that they do not consume red meat during the week and half of the sample (52,2%) say that they only eat red meat 1 or 2 times per week. The last week of maintenance period (36th week) 71,7% say that they do not consume red meat during the week.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is $\leq$0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.728. This means that the weeks and

the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Frequency of eating red meat

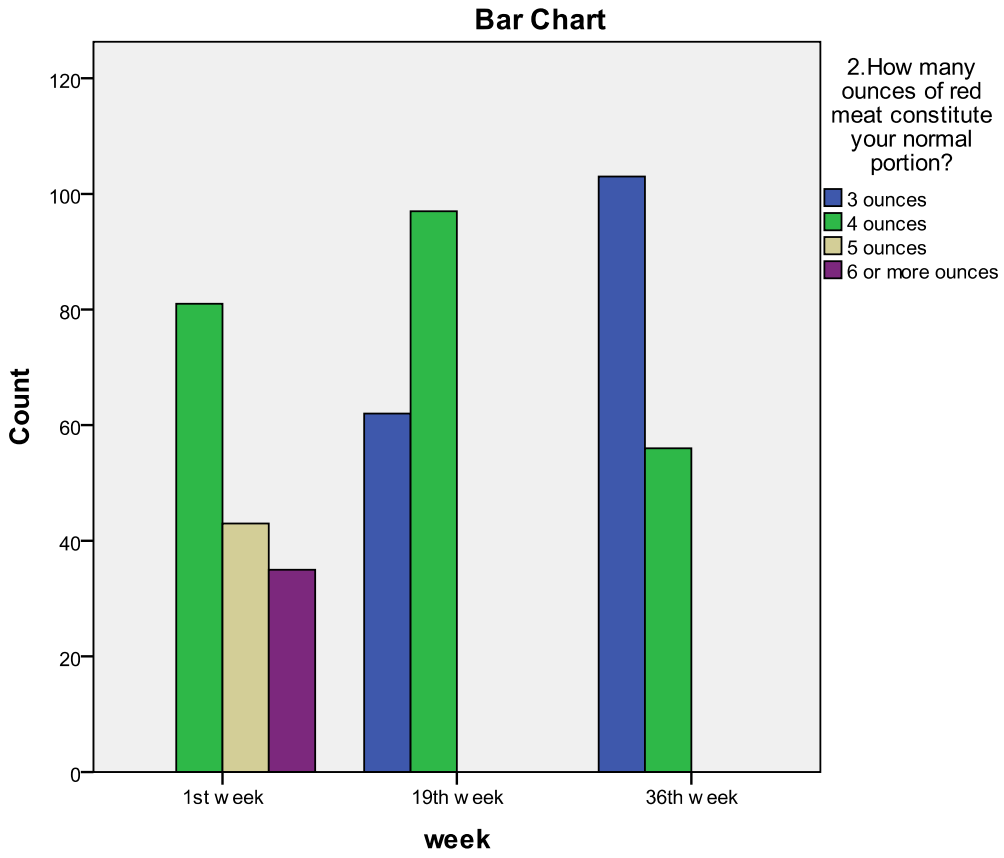
For week 1, the majority (n = 70) of the respondents were eating red meat 3 to 4 times a week but there are also those who ate red meat 5 to 6 times a week (n = 35) and more than 6 times a week (n = 22). Since red meat is considered as one of the foods with high proportion of saturated fat and caloric value, the initial measurement showed that the intervention group members were consuming high saturated fat and calories based on the frequency of their red meat intake. The portions will be considered in the following sections. There was, however, a decreased intake in red meat for the successive weeks. For week 19, there were more respondents who stopped eating red meat (n = 50) and fewer respondents eating red meat for 3 to 4 times a week (n = 26). The measurement in

week 36 showed a significant increase of respondents not eating red meat (n = 114) and only 3 respondents eating red meat for 3 to 4 times a week.

The cross tabulation table below shows the eating behavior changes through the weeks based on the amount of red meat consumed as a portion size. It is obvious that on the 1st week, the majority of people used to consider the 4 ounces (oz) of red meat as their portion size (50.9%) and in the last week (36th week) the vast majority of people (64.8%) considered their portion size of red meat the 3 oz.

The respondents' amount of red meat intake was also measured because this is also an important consideration because even if the frequency of red meat consumption is low but of large quantity then it defeats the purpose of curbing the weekly fat and caloric intake. For week 1, the portion of the respondents' red meat intake ranges from 4 oz (n = 81, 50.9%) to 5oz (n=43, 27%), to 6oz or more (n = 35, 22%) and none of them consumed 3oz of meat as their portion size (n=0, 0%). There was also a decrease in the portion of red meat intake in week 19 and week 36. There were 62 (39%) respondents who had 3 oz of red meat in week 19 which increased in week 36 with 103 respondents (64.8%) saying their red meat intake was 3 oz. In addition, while in week 19 the 61% consumed 4oz of red meat as their portion size, 0% consumed neither the 5 oz nor the 6oz or more of red meat. In week 36, there was a decrease on the respondents consuming 4oz as their portion size to 35.2% while those consuming 5oz or 6 oz remained to 0%.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.651. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.

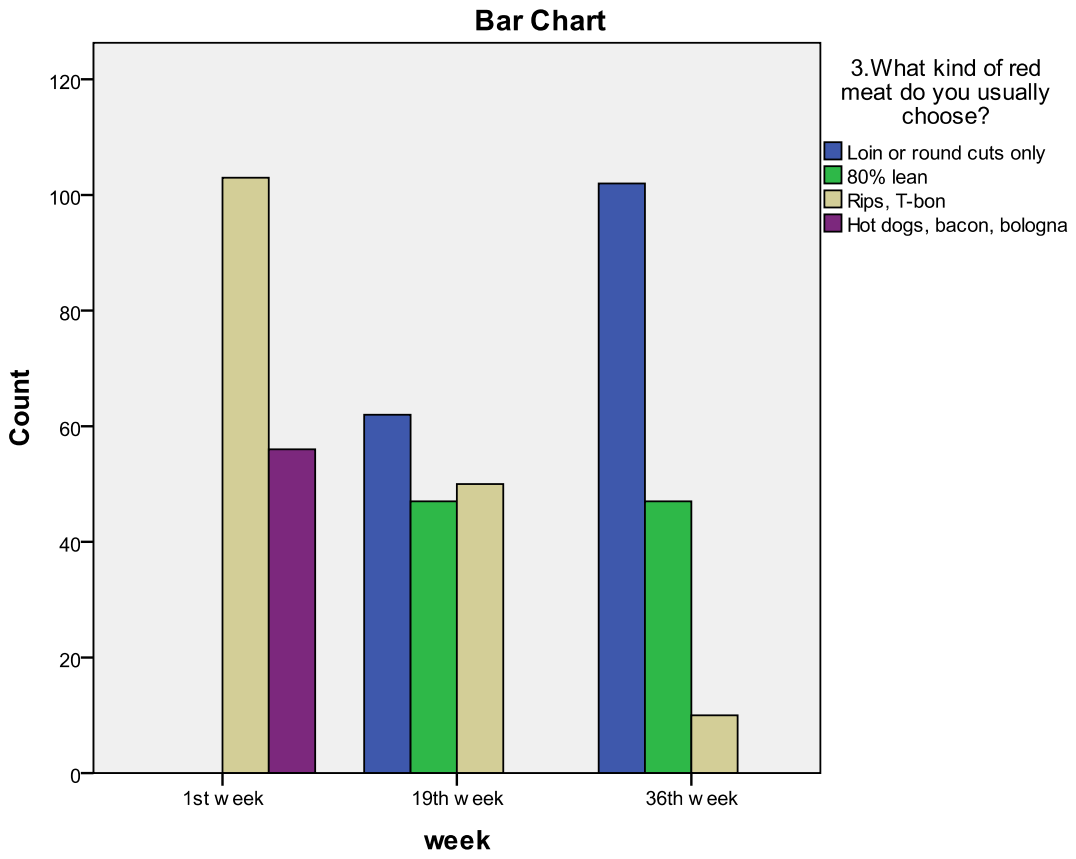


Type of red meat chosen by respondents

Aside from the frequency and portion, the type of red meat chosen by the respondents needs to be examined because there are cuts that are considered healthier containing less fat and calories. For week 0, it was observed that the majority of the respondents chose T-bone steaks (n = 103, 64.8%) and hotdogs (n = 56, 35.2%) while none of them chose loin or round cuts only or the 80% lean. With the use of the nutrition software FoodWorks (1997-2010) it was shown that a 3 oz T-bone cut with a B- since it contains 7.6 g of fat. There was also a shift in the type of meat chosen by the respondents. Toward week 19, there were 62 respondents (39%) who shifted to loin or round cuts and 47 respondents (29.6%) to 80% lean which are both less fatty cuts of meat. In week 36,

the majority of the respondents (n=102, 64.2%) chose loin or round cuts and the 29.6% chose the 80% lean. Those choosing T-bone and ribs significantly reduced to about 10 respondents (6.3%).

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.748. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.

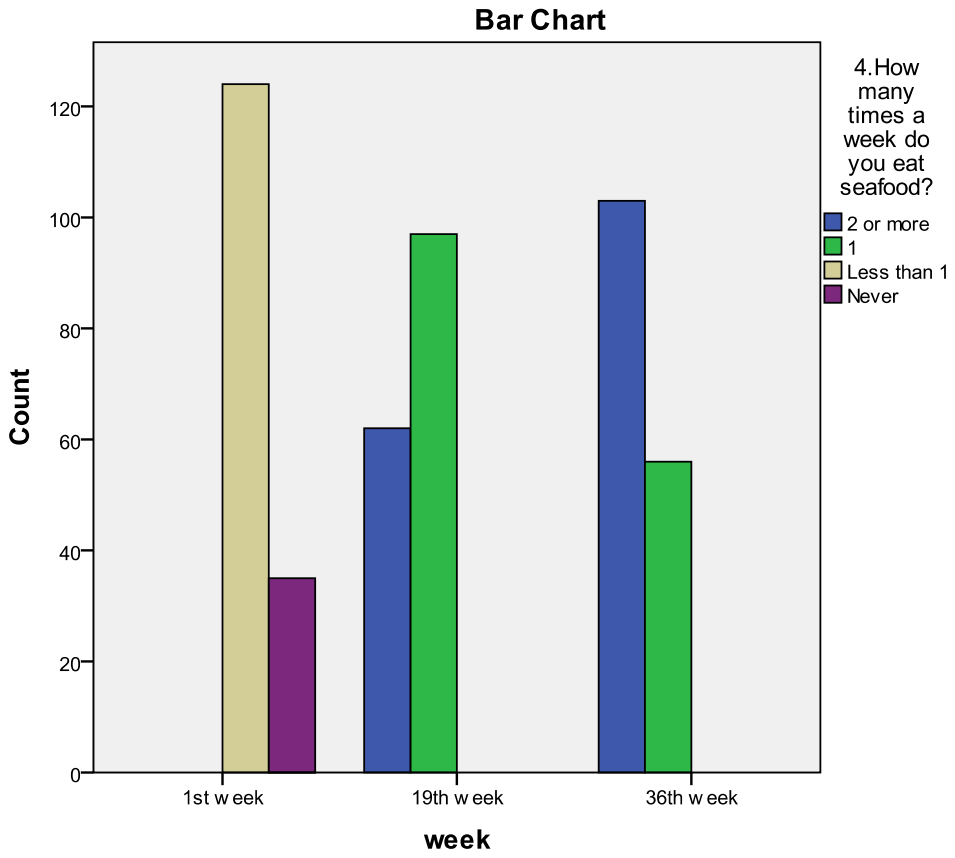


Frequency of eating seafood

Seafood which includes fish, clams, oysters, shrimps and the like are healthy alternatives to meat and poultry due to their vitamin, protein, polyunsaturated fat and mineral content. Polyunsaturated fat of fish due to its omega-3 content is very beneficial to the treatment of hyperlipedemia, osteoporosis, blood pressure among other problems and it is easier to absorb and is needed by the body (N.R.G. 2006). As such, for people who want to manage their weight, seafood is one healthy option.

The respondents during the initial assessment of the checklist were not avid fans of seafood. The majority (n = 124, 78%) of them included seafood in their meals only less than once a week while 35 of them (22%) said they never included seafood in their meals. Week 19 and week 36 showed increase in those who included seafood in their meals and increase in the number of times they ate seafood in a week. To be more specific, the 19th week, 39% of the sample answered that they ate fish during a week twice or more while 61% ate fish once a week. During the maintenance period (up t week 36) 64.8% ate fish twice or more per week and 35.2% once per week. Both in weeks 19 and 36, it was noted that 0% ate fish less than once per week and 0% stated that they never ate fish during the week.

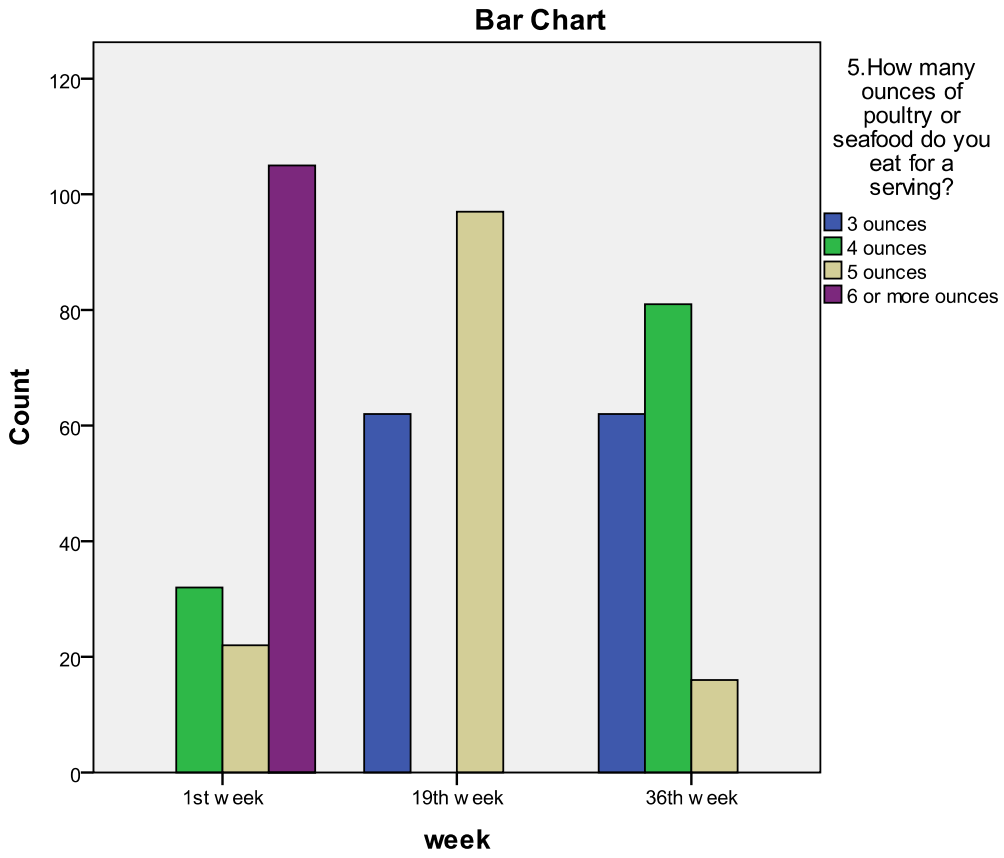
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.800. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.


Bar Chart
Count
120
100
80
60
40
20
0
1st week
19th week
36th week
week
4.How many times a week do you eat seafood?
2 or more
1
Less than 1
Never

Portion of poultry or seafood per serving

Although seafood and poultry are considered as healthy options, these should be taken in reasonable amounts. Too much of these can still result in fat accumulation and high caloric intake. The respondents, in the initial assessment of the checklist (week 1)said that if they were to include poultry or seafood in their meals, the majority (n = 105, 66%) consumed 6 oz or more of these as their portion size while 20.1% consumed 4oz, 13.8% consumed 5 oz and 0% consumed 3 oz. This changed however, in the successive measurements where in week 19 61% consumed 5 oz, 39% consumed 3oz and 0% consumed 4oz or 6oz or more, respectively. In week 36 about 62 respondents (39%) took as their portion size 3 oz of poultry or seafood and 81 respondents (50.9%) consumed 4oz per serving of the same products. Also, only 16 (10.1%) were taking in about 5 oz of poultry or seafood per serving and none took 6 oz or more poultry or seafood per serving. This shows an effort in curbing the amount of food intake.

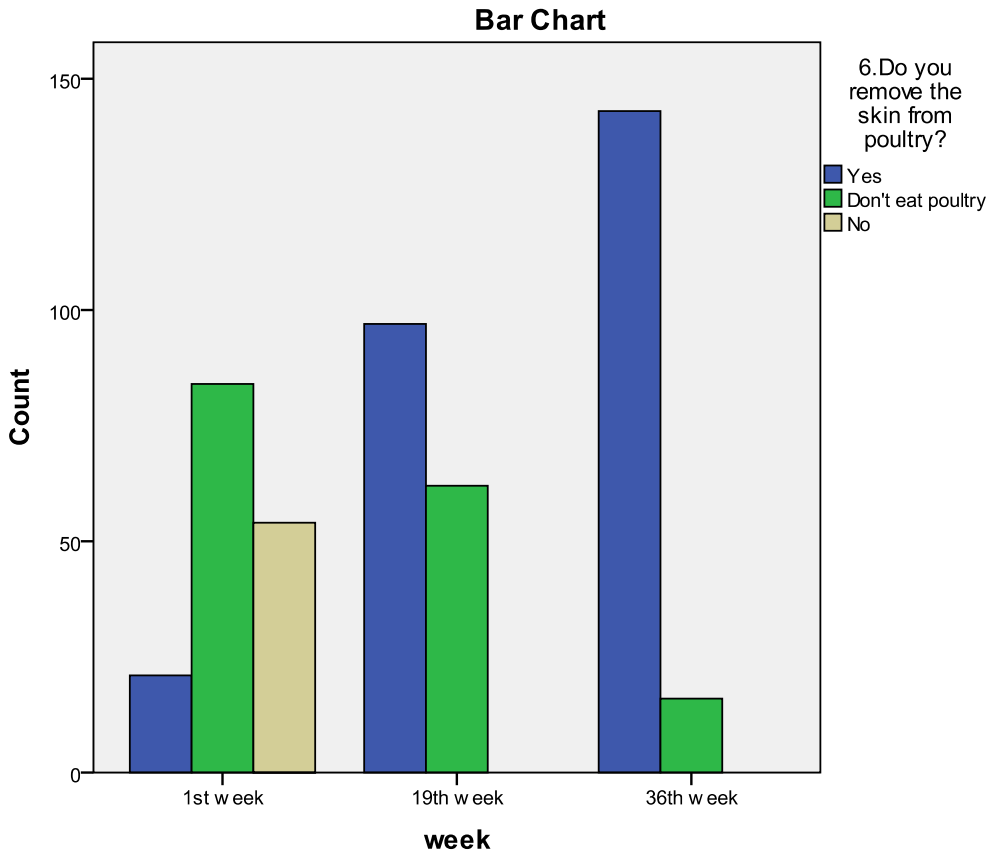
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.647. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Removing skin from poultry

During the initial assessment of checklist A, the majority (n = 84, 52.8%) did not eat any poultry. While a large number (n = 54, 34%) said that they did not remove the skin from their poultry. Not removing skin from the poultry is considered unhealthy because the skin contains much of the saturated fat and calories. However, there were better eating habits evident among the respondents by week 19 where 97 respondents (61%) were already removing skin from their poultry and those not eating poultry reduced to 62 respondents (39%). By week 36 about 143 respondents (89.9%) were already eating poultry and also removing skin from their servings. It is very important to be noted that both in weeks 19 and 36, 0% of the respondents stated that they did not remove the skin from the poultry.

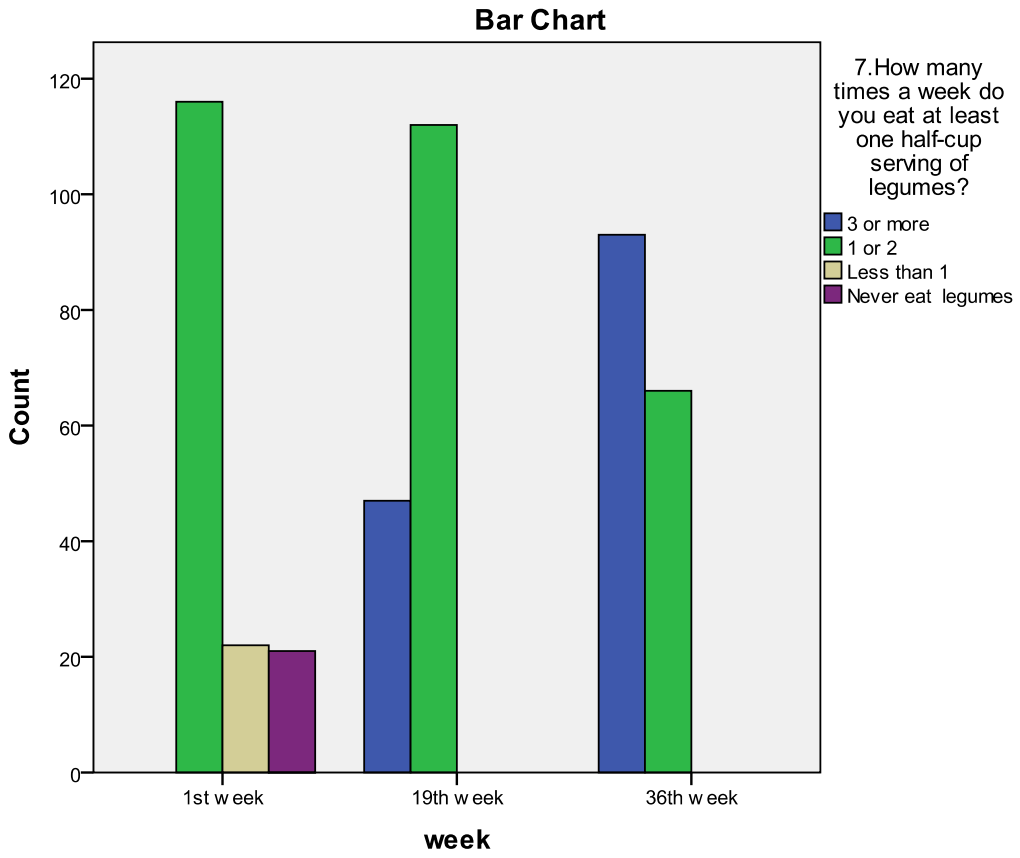
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.655. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Eating legumes

Legumes, like dried beans, lentils, black eye beans, are good dietary sources of fiber and also of protein and amino acids. These should be made part of the weekly diet not only for those who are into a certain weight management program but of every individual who wants to eat healthy. By week 1, there were 116 respondents (73%) who said that they were eating legumes 1 or 2 times per week. This improved by week 19 where all respondents were eating legumes. To be more specific, 29.6% ate legumes 3times or more per week, 70.4% ate 1-2 per week and none of them ate less than 1 time per week or not eaten at all legume. Also, in week 36, 58.5% ate legumes 3times or more per week, 41.5% ate 1-2 per week and none of them ate less than 1 time per week or not eaten at all legume.

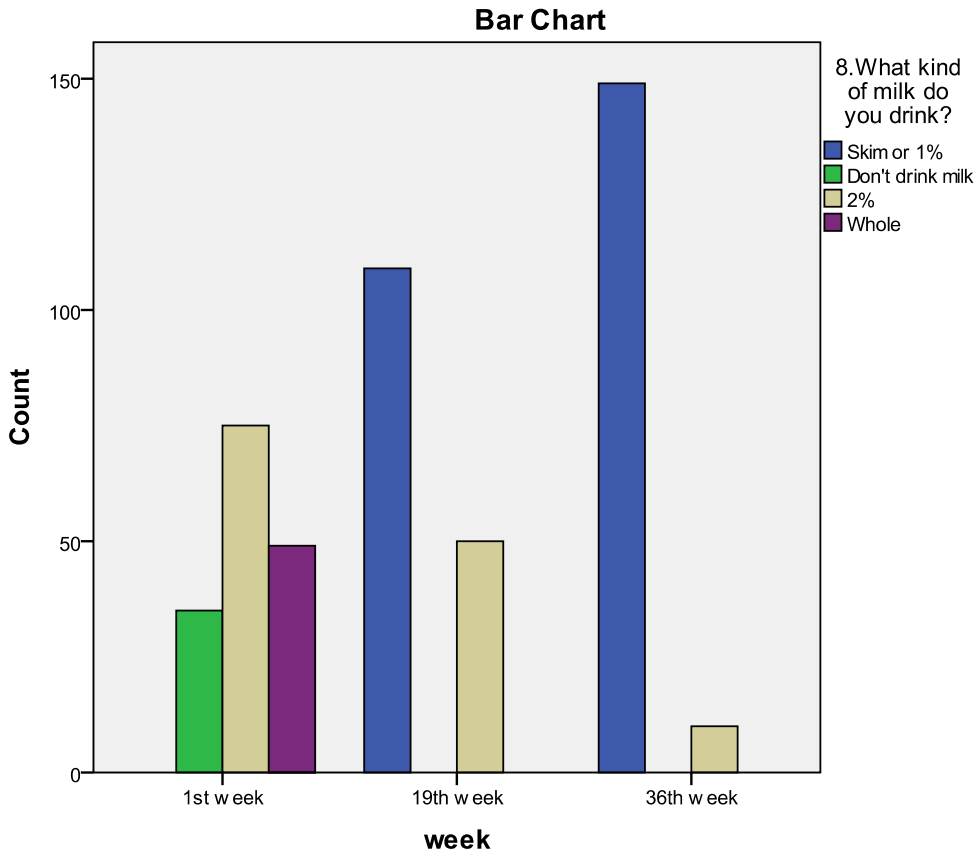
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.573. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.


Bar Chart
Count
120
100
80
60
40
20
0
1st w eek
19th w eek
36th w eek
week
7.How many times a week do you eat at least one half-cup serving of legumes?
3 or more
1 or 2
Less than 1
Never eat legumes

Type of milk

Milk is a good dietary source of calcium and proteins but also a rich source of fat. For obese people, this is one part of the meal and beverage that should be taken into consideration due its fat and caloric content. There is a number of milk types available in the market that suits the needs of each and every age, body type and body needs but sometimes, this awareness is not ubiquitous. In a weight management program, switching from one dietary source with high fat percentage to another with less fat and calories is the best option rather than eliminating dietary intake all together since there are important vitamins and minerals present in milk that are needed for metabolism. The first week of measurement showed that there are those who do not drink milk (n = 35, 22%), those who drunk whole milk (n=49, 30.8%), and the majority who drunk 2% milk (n=75, 47.2%) and none of them drunk skim or 1% (n=0, 0%). However, this changed gradually from week 19 to week 36 where the respondents switched from 2% to 1% or skim milk. To be more specific in the 19 week 68.6% drunk skim or 1% and 31.4% drunk 2% . In the 36 week 93.7% drunk skim or 1% and 6.3% drunk 2%.

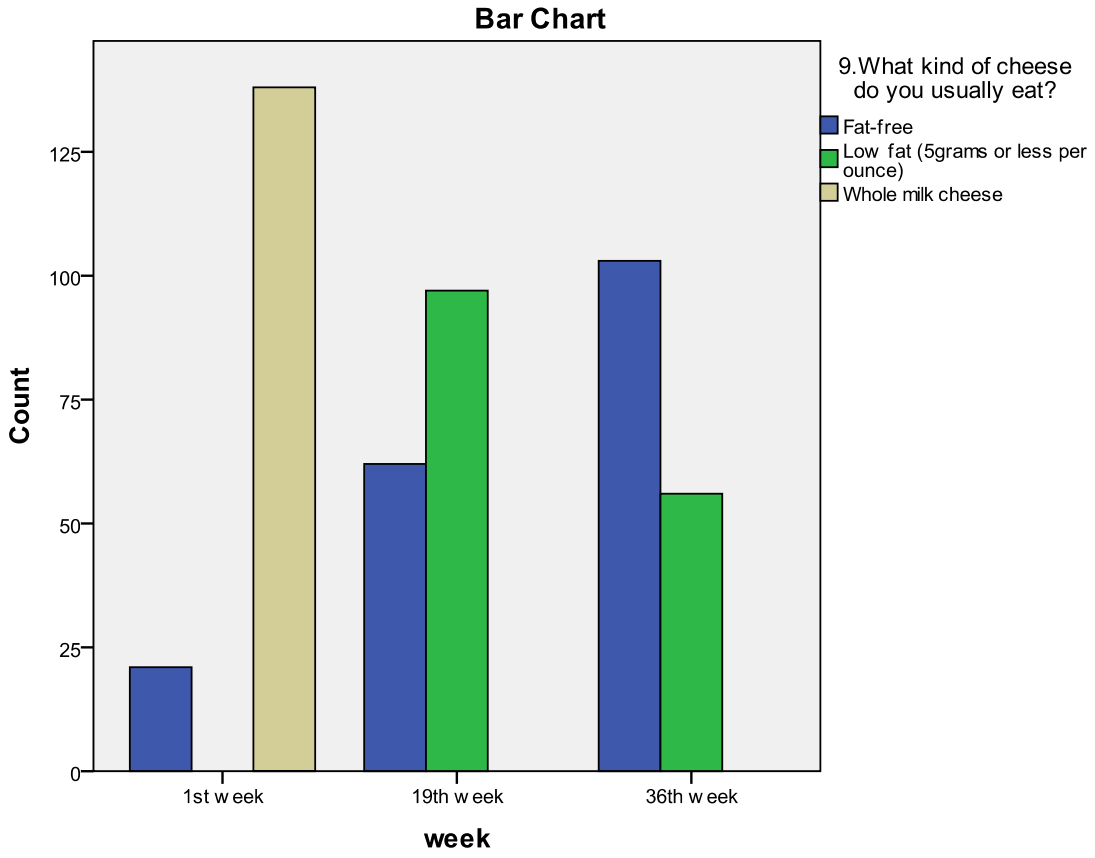
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.718. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Cheese intake

Cheese, like milk is a good dietary source of important nutrients but is also a high fat source with concentrated calories from saturated fat. This is also a component for many dishes or just plain part of breakfast or snacks. This should not be eliminated from the diet but rather should be chosen wisely. The first week of the checklist A assessment showed that the majority (n = 138, 86.8%) of the respondents selected whole milk cheeses but there were also those who were already conscious of these (n = 21, 13.2%) and selected fat-free cheeses. The respondents have changed their views in terms of cheese intake from whole milk to low fat such that there were already 97 respondents (61%) selecting low fat cheeses and 62 respondents (39%) selecting fat-free by week 19. There was further improvement in the selection by week 36 as there were already 103 respondents (64.8%) selecting fat-free cheeses and 56 respondents (35.2%) selecting low-fat cheeses. There were no respondents selecting whole milk cheeses by week 36.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.742. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



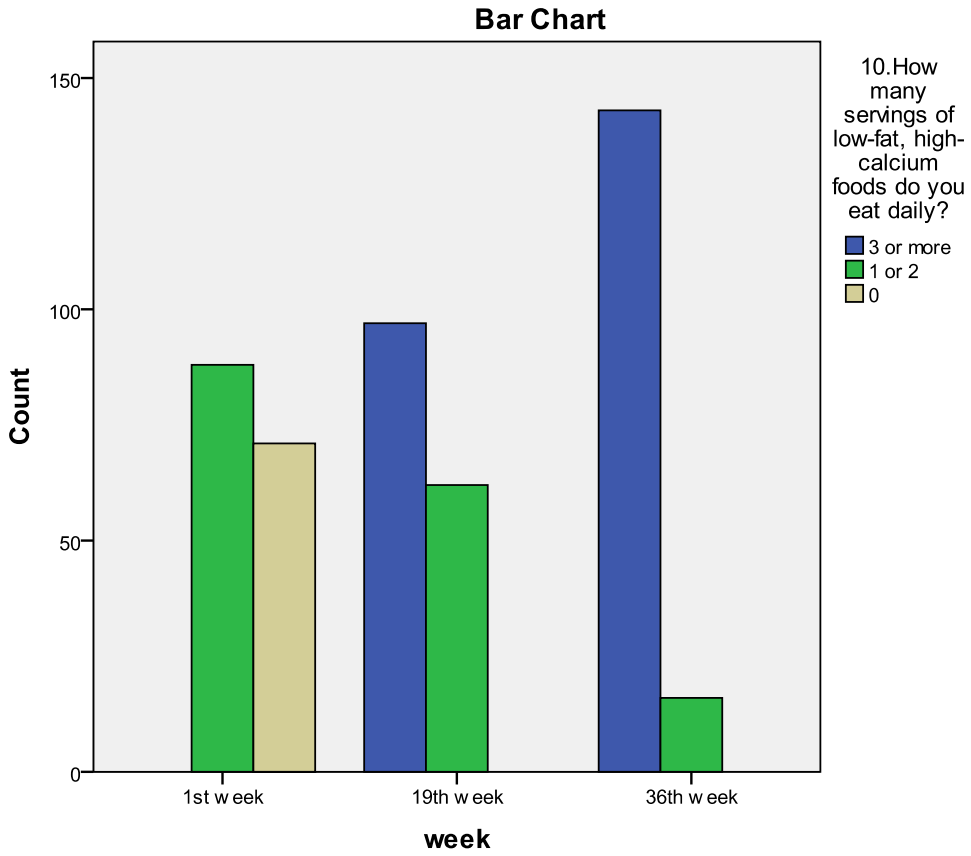
Intake of low-fat high calcium food sources

Dietary calcium plays a pivotal role in the regulation of energy metabolism; high calcium diets attenuate weight gain during periods of overconsumption and preserve thermogenesis during caloric restriction, thereby markedly accelerating weight loss. Moreover, it has been demonstrated that the increased calcitriol released in response to low calcium diets stimulates Ca2+ influx in human adipocytes and thereby promotes adiposity. Accordingly, suppressing calcitriol levels by increasing dietary calcium is an attractive target for the prevention and management of obesity. Further, low calcium diets impede body fat loss, while high calcium diets markedly accelerate fat loss in transgenic mice subjected to caloric restriction (Zemel 2002).

Aside from milks and cheeses, there are other food sources that are high in calcium and normally have high fat content too. As such, the selection should include not only food sources high in calcium but also low in fat. Some of these sources include some type of fish, yogurt and low fat halloumi (up to 10% fat). In the first week, 71 respondents (44.7%) said that they did not consume any high calcium low-fat food sources while 88 (55.3%) said that they ate the 1 or 2 servings daily. Taking into account that according to DRI the recommended amount of calcium for adults is 1000-1200mg per day this will safely lead to 3-4 servings of high calcium servings per day. One serving of high calcium and low fat food can be equivalent to 1 cup of milk (skim or 1% fat) or 1cup of yogurt (low fat or 1% fat) or 40gr cheese or 40gr halloumi (up to 10% fat) .This shows that at the onset, there was some awareness in their part and there was already the desire to manage their weight as demonstrated by this eating habit. Eventually, by week 19, about 97(61%) respondents and by week 36, about 143 (89.9%) respondents about said that they were consuming 3 or more high calcium low-fat food sources per day while none of them claimed that they did not consume any of these products for weeks 19 and 36.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected.

The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.753. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.

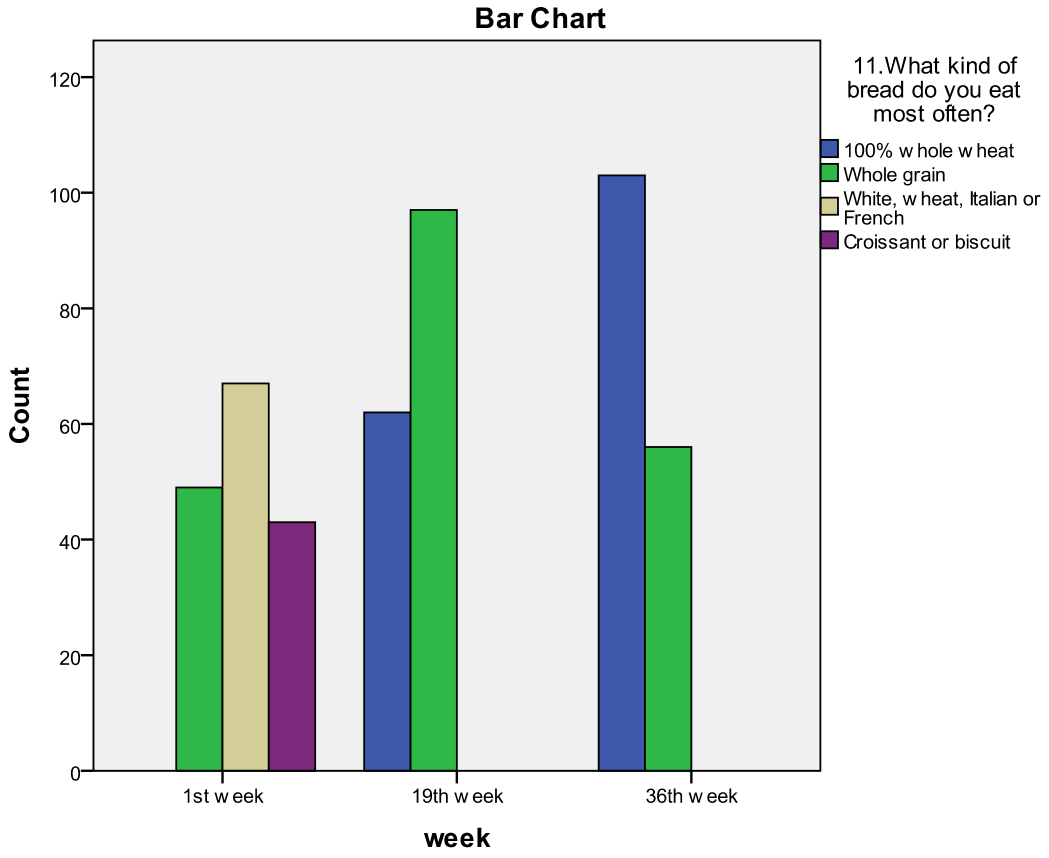


Kind of bread eaten

The more popular choices of breads by the respondents in week 1 were white wheat, Italian or French bread (n = 67, 42.1%). There were also those who preferred the whole grain (n=49, 30.8%) and those who preferred the buttery and creamy croissants (n = 43, 27%). Fiber, which is of the main substances in the 100% whole wheat and whole wheat bread, is considered to be beneficial for the weight loss and it retains the sense of satiety for longer period of time and therefore it can decrease of the total amount of food consumed. There are several studies supporting the effects of dietary fiber on hunger, satiety, energy intake, and body composition in healthy individuals. Under conditions of fixed energy intake, the majority of studies indicate that an increase in either soluble or insoluble fiber intake increases postmeal satiety and decreases subsequent hunger. When energy intake is ad libitum, mean values for published studies indicate that consumption of an additional 14 g/day fiber for >2 days is associated with a 10% decrease in energy intake and body weight loss of 1.9 kg over 3.8 months. Furthermore, obese individuals may exhibit a greater suppression of energy intake and body weight loss (mean energy intake in all studies was reduced to 82% by higher fiber intake in overweight/obese people versus 94% in lean people; body weight loss was 2.4 kg versus 0.8 kg). These amounts are very similar to the mean changes in energy intake and body weight changes observed when dietary fat content is lowered from 38% to 24% of energy intake in controlled studies of non obese and obese subjects. Efforts to increase dietary fiber in individuals consuming <25 g/day may help to decrease the currently high national prevalence of obesity (Howarth 2001). For the purposes of this study the amount of the fiber was not the issue rather than the inclusion of fiber sources (legumes, whole wheat bread, fruits and vegetables).

With the desire of the respondents to change their lifestyles and manage their weight in the process, they managed to shift from white wheat and croissants to whole wheat and high-fiber breads. By week 19 there were 97 (61%) respondents that included whole wheat breads in their diets and 62 (39%) consuming 100% whole wheat. In addition, in 36 week there were 103 (64.8%) respondents that included 100% whole wheat breads in their diets and 56 (35.2%) taking in whole wheat breads.

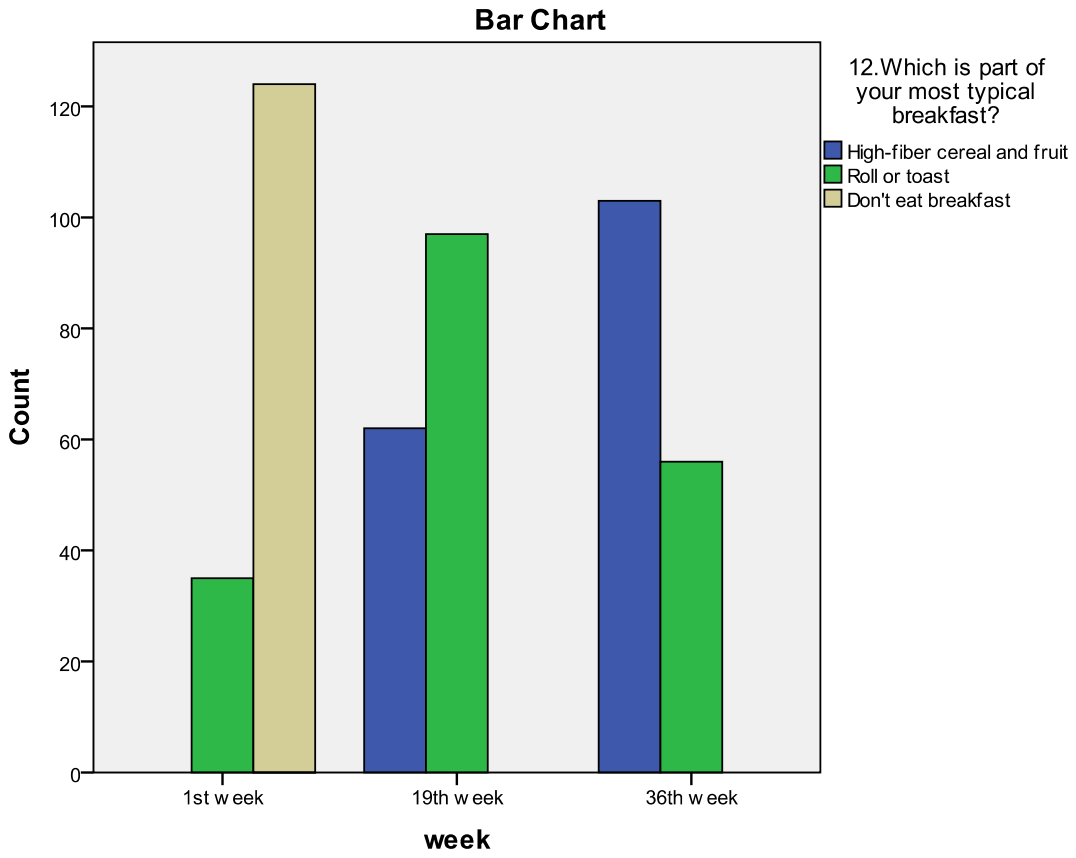
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.710. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Breakfast

Eating breakfast has always been prescribed by many as a healthy eating habit. Skipping breakfast is considered a big mistake since it disrupts metabolism and makes people eat unhealthier due to the frequent snacking and unmonitored calorie intake (National Task Force on Prevention and Treatment of Obesity 2000). At the onset, the majority (n = 124, 78%) of the respondents were not eating breakfast while 35 (22%) ate roll or toast and none of them high- fiber cereal and fruit. By week 19 however, while the majority (n = 97, 61%) were eating roll or toast, there was a significant increase on the consumption of high fiber cereal and fruit (n=62, 39%) and none of them reported that they did not eat breakfast. Furthermore, up to week 36, the majority (n = 103, 64.8%) were already eating breakfast and including high-fiber cereal or fruit in their diet, and there was a considerable decrease on those eating a roll or a toast (n=56, 35.2%). The importance of the contribution of fiber to the weight loss is explained above.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.749. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.

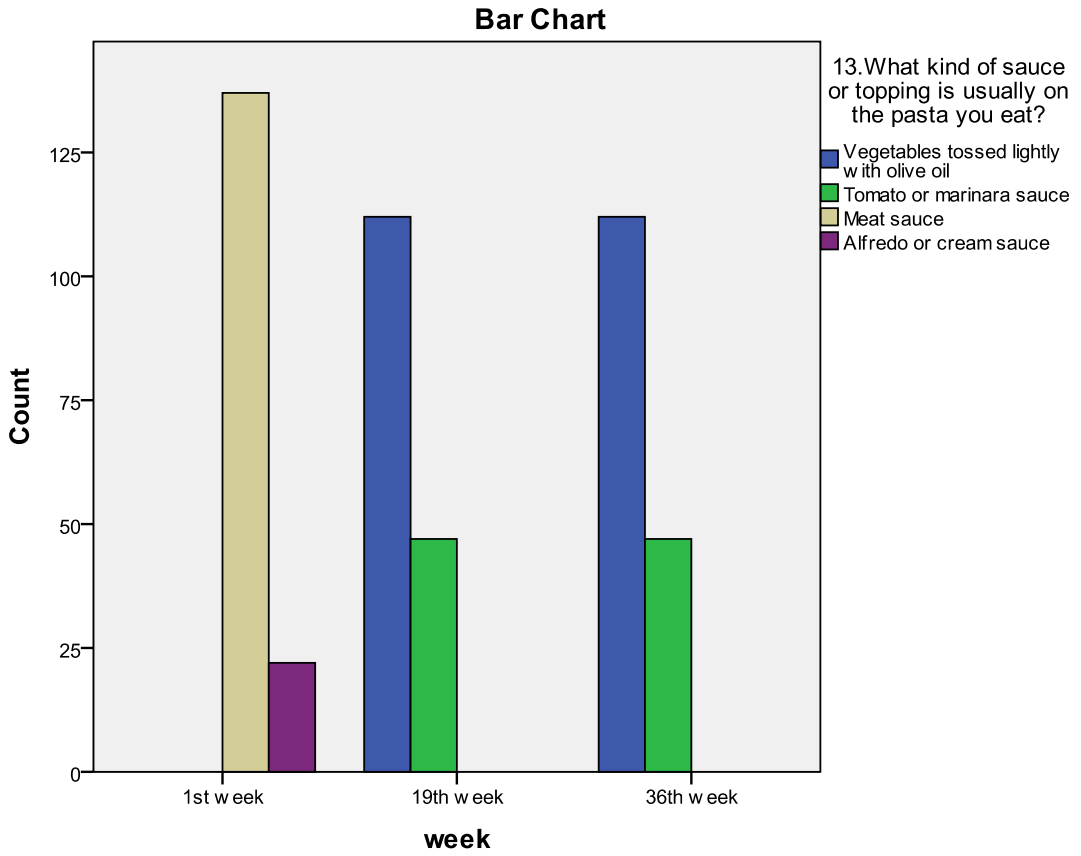


Sauce in pasta

There is a wide variety of pasta sauces, which can be creamy and fatty or light and healthy. Since pasta is one of the more prevalent dishes served at home, in fast food establishments and restaurants, more healthy options should be considered when eating out. By week 1, the pasta choices of the respondents were meat sauce (n = 137, 86.2%) and Alfredo (n = 22, 13.8%), both high in fat, butter, and cream and consequently high in calories. However, by week 19, there were 112(70.4%) respondents choosing veggies tossed lightly with olive oil and 47 (29.6%) respondents choosing marinara or tomato based sauces. This number was maintained up till week 36. Although, there was no increase in the respondents choosing vegetables in olive, there was no regression or slipping back to meat sauce or Alfredo/creamy sauce.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected.

The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.771. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Ordering Chinese

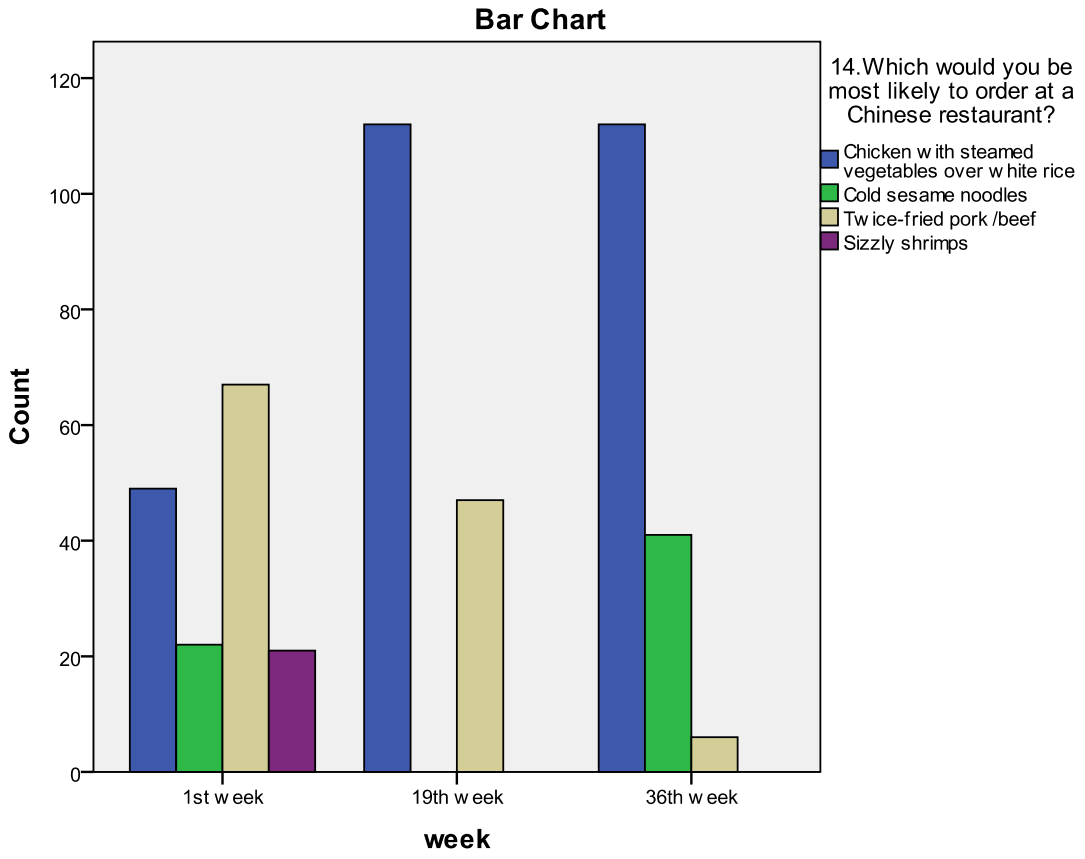
There is a number of Chinese recipes that are fatty in the sense that these are deep fried or sautéed in oils. However, there are healthier options from Chinese food since some are blanched, steamed, or raw. Chinese foods are popular take-out options and fast fixes for meals. Too much of these can cause increase in body weight due to the high fat and high caloric content. That is why it is important for those conscious of their weight to determine which types of Chinese food to order.

For the respondents popular choices for Chinese food in week 1 were twice fried beef or pork (n = 67, 42.1%) and chicken with steamed vegetables over white rice (n=49, 30.8%), cold sesame noodles (n=22, 13.8%) and sizzling shrimp (n = 21, 13.2%). Although shrimp falls into the category of seafood and is considered a healthier option as opposed to pork and red meat, the way it is cooked can be a hindrance to weight management. Awareness on health issues is evident also in this instance among the respondents because some were eating chicken with steamed vegetables over white rice and cold sesame noodles. However, by week 19, the group was divided in their choice and this included chicken and steamed vegetables over rice (n = 112, 70.4%) and the other group maintained to order twice fried pork or beef (n = 47, 29.6%). By week 36, only 6 respondents (3.8%) still selected twice fried pork or beef and the rest is divided into cold sesame noodles (n = 41, 25.8%) and chicken with steamed vegetables over rice (n = 112, 70.4%).

There seemed to be difficulty for some to let go of the twice fried pork or beef as options in ordering Chinese food. However, whether there was some form of regression in the development or in the shift, 112 respondents, which represented the 70.4%, maintained chicken with steamed vegetables over rice as their healthy option.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that

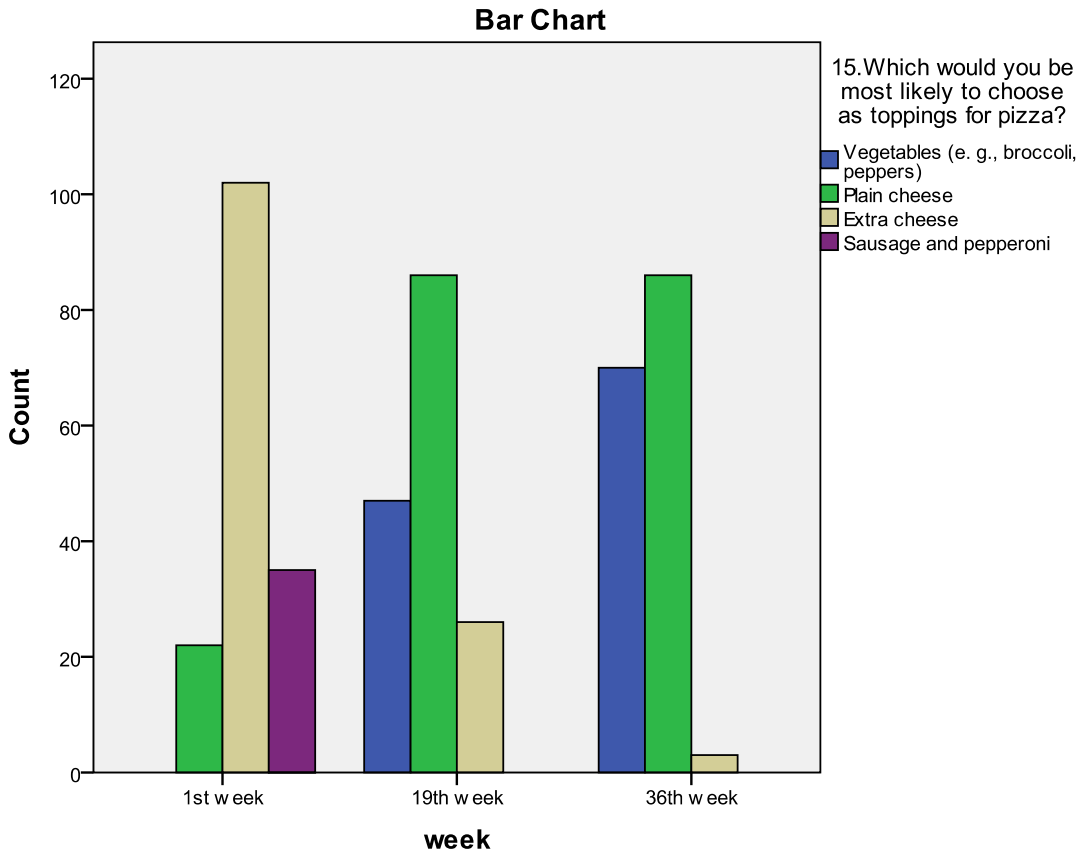
the correlation coefficient (Pearson r) equals to -0.436. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Pizza toppings

To be more specific, the 1st week, 64.2% of the sample answered that they would choose as topping for pizza the extra cheese, 22% the sausage and pepperoni, 13.8% plain pizza and 0% vegetables. It is interesting to see that none of them (0%) chose vegetables for their pizza. When they finished the weight loss period (19th week), 54.1% stated that they prefer plain cheese, 29.6% vegetables as topping, 16.4% extra cheese and 0% sausage and pepperoni. The last week of maintenance period (36th week) 54.1% preferred plain cheese, 44% vegetables, only 1.9% extra cheese and still none chose sausage and pepperoni.

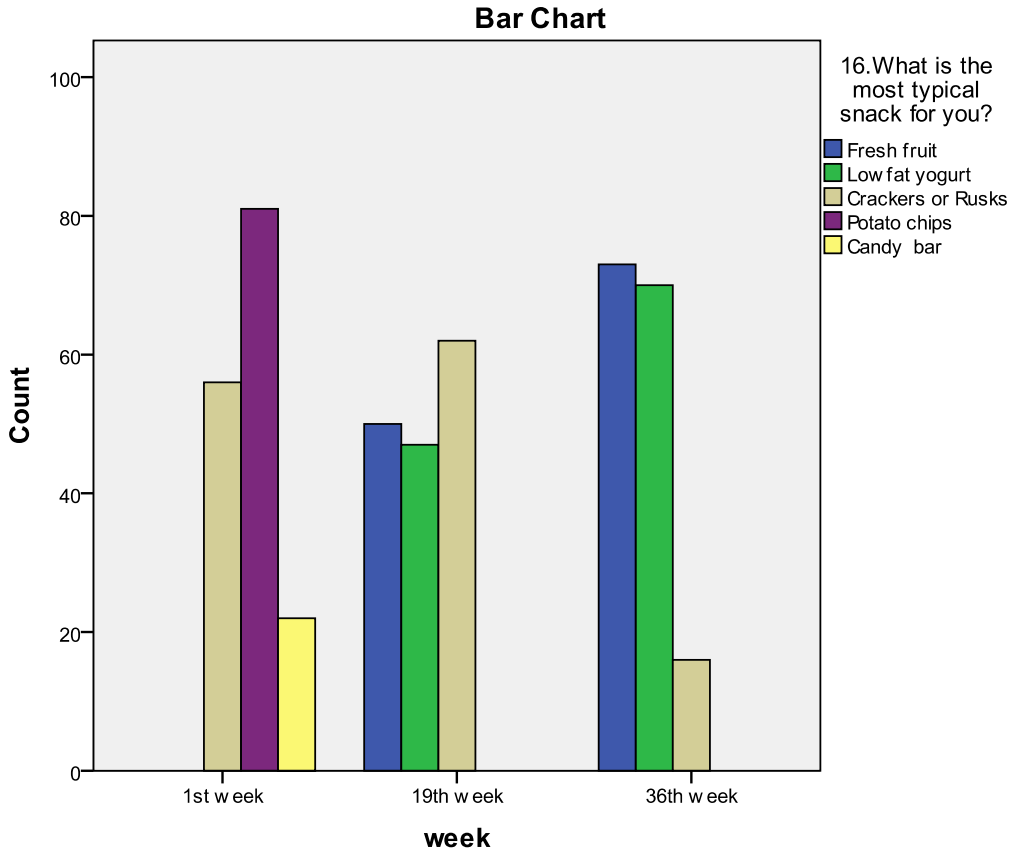
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.690. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Snacks

Too much snacking and the type of snacks also contribute to obesity (National Task Force on Prevention and Treatment of Obesity, 2000). As such, there should be more conscious efforts among the respondents to change their types of snacks. During the first week, there were more respondents snacking on potato chips (n = 81, 50.9%), crackers or rusks (n=56, 35.2%), candy bars (n = 22, 13.8%) and none were snacking on fruits or yogurt. However, during the 19th week there was a significance change in their choices, there were already 50 respondents (31.4%) snacking on fruits and 47 respondents (29.6%) snacking on yogurt. Snacking on crackers or rusks was one of their favor choice (n=62, 39%). It should also be significant to note that there were no respondents snacking on potato chips and candy bars by week 19. By week 36, respondents snacking on fruits (n = 73, 45.9%) and yogurt (n = 70, 44%) increased even more where only 10.1% (n=16) snacked on crackers or rusks.

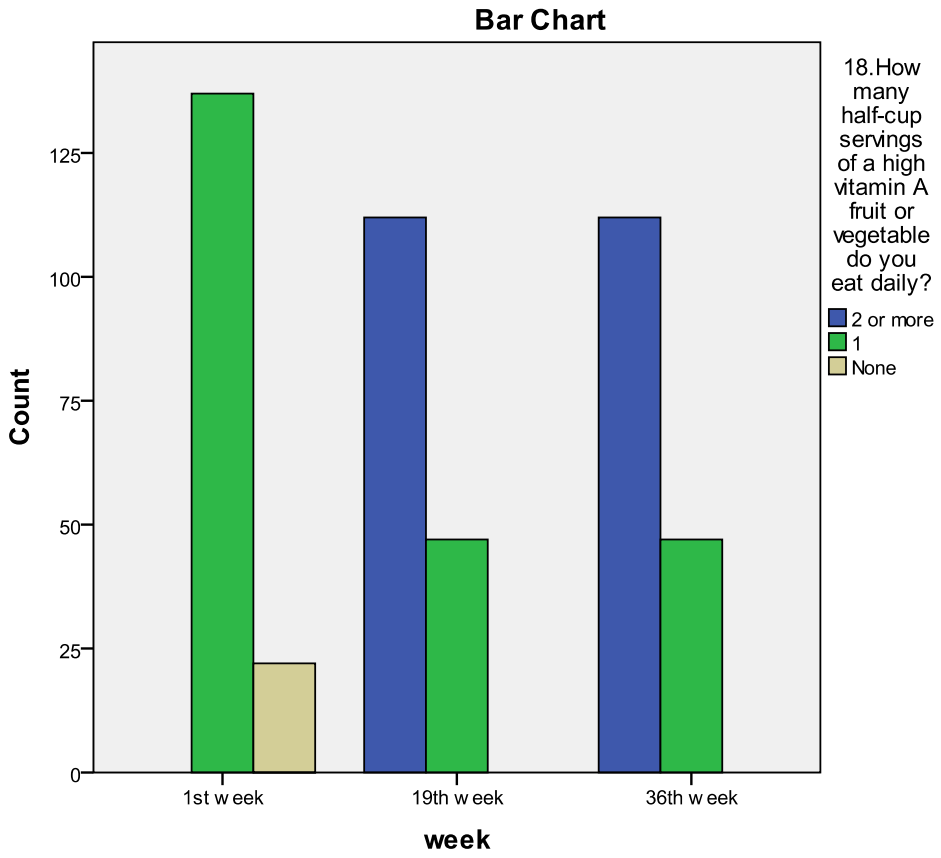
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.740. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Daily servings of fruits and vegetables high in vitamin A

According to DRI, the recommended daily amount for vitamin A for the ages 19-51 for Males, Females is 3000 µg/d Retinol (10000 IU) (see Appendix Checklist A). In order to cover this quantity from fruits and vegetables, 2-3 servings of fruits and another 2-3 servings of vegetables of ½ cup portion of good sources of vitamin A are needed (see Appendix Checklist A). Good vegetarian sources of vitamin A are cantaloupe, guava, broccoli, Brussels sprouts. The majority of the respondents (n = 137, 86.2%) only had one serving of half cup fruits and vegetables that are high in vitamin A, while 13.8% (n=22) did not consume any sources of vitamin A and 0% (n=0) ate 2 or more serving of this food group.. Fortunately by week 19 there were already 112 respondents (70.4%) having 2 or more half cup servings of fruits and vegetables high in Vitamin A. The same number of respondents continued the same consumption by week 36, that is 70.4% consumed hight vit sources twice or more daily, 29.6% once a day and 0% none a day. Although there was an increase by week 19, it was still significant the maintenance of this behavior by week 36.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.587. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.

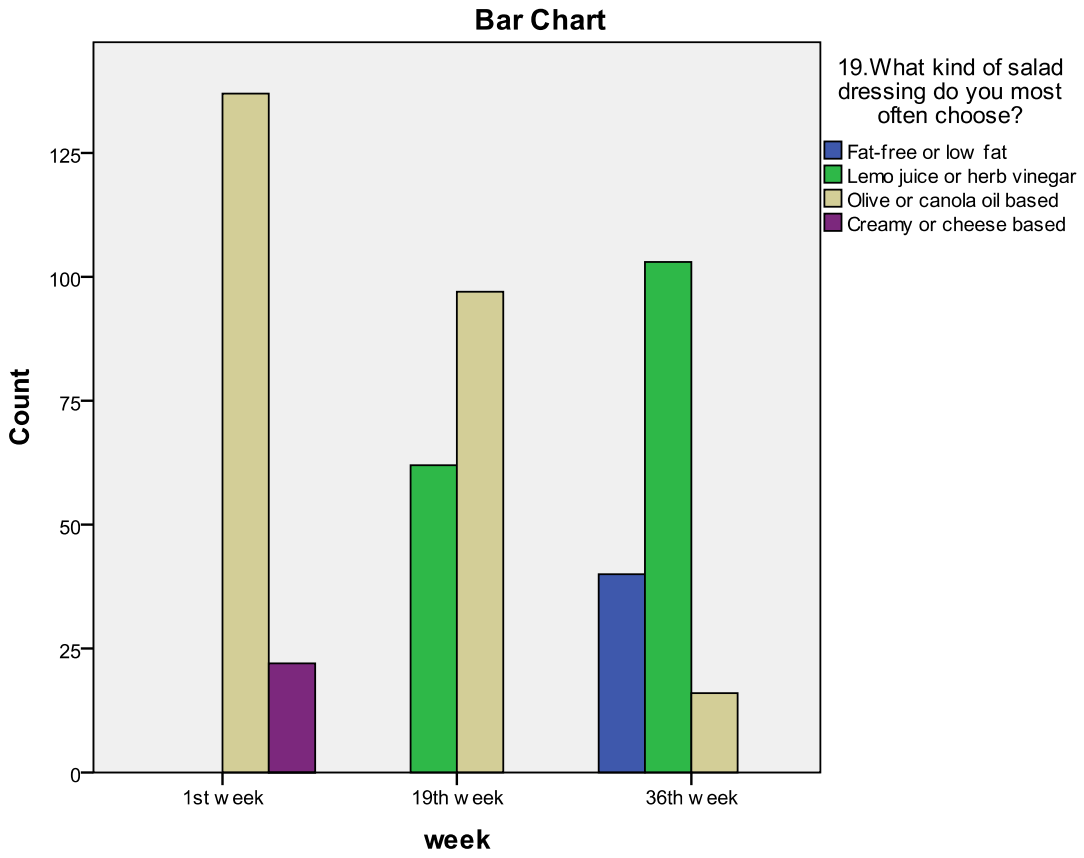

Bar Chart
Count
125
100
75
50
25
0
1st w eek
19th w eek
36th w eek
week
18.How many half-cup servings of a high vitamin A fruit or vegetable do you eat daily?
2 or more
1
None

Kind of salad dressing chosen

Salad dressing choices in the checklist A included fat free or low-fat dressing, lemon juice or herb vinegar, olive oil or canola based, and creamy or cheese bread. Salads as part of meals or as sources of fruits and vegetables are healthy but then again this depends on the salad dressings since creamy or cheese based have more saturated fat and calorie content than salad dressings that are fat-free and lemon juice or herb vinegar. At the onset, the respondents were opting more olive oil or canola based (n = 137, 86.2%) and creamy or cheese based (n = 22, 13.8%). However, this changed by week 19 where there were 62 respondents (39%) opting for lemon juice or herb vinegar dressings, there were no more respondents choosing creamy or cheese based salad dressings and there was a decrease on those choosing olive and canola oil (n=97, 61%). By week 36, there were already 103 respondents (64.8%) opting for lemon juice or herb vinegar dressings but there were also those who chose fat free salad dressings (n = 40, 25.2%), while there was an even further decrease on selecting olive and canola oil (n=16, 10.1%).

The change in salad dressing options shows that the respondents were willing to change their eating habits. At this point, it can be seen that they have already changed their proportions of meat, type of meat chosen, choice of salad dressing, etc. Their change in eating habits are not limited to only one aspect in the diet which means that they were dedicated to their weight management programme.

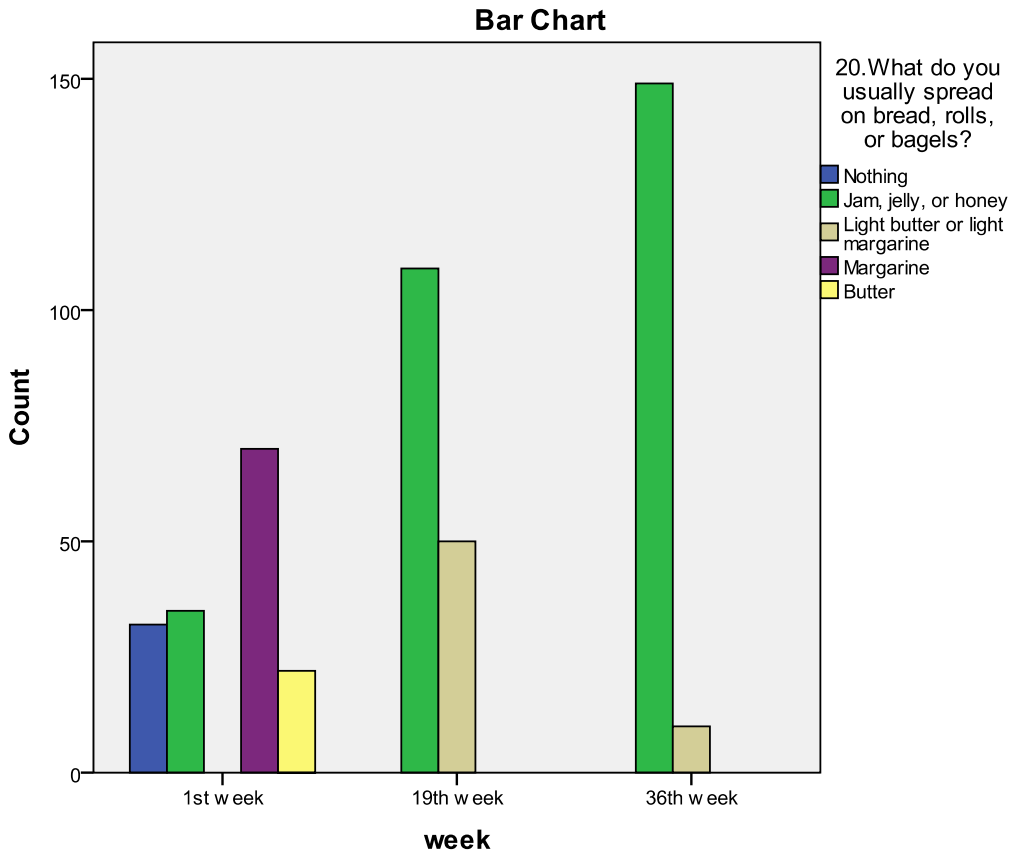
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.739. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Spread in Bread, Rolls or Bagels

At the onset (week 1), the respondents' choices of spread on their bread, rolls or bagels included butter (n = 22, 13.8%), nothing (n=32, 20.1%), jam, jelly or honey (n = 35, 22%), margarine (n = 70, 44%) and light butter or light margarine (n=0, 0%). By week 19 and week 36 however, there were only two choices for the respondents and these were jam or light butter/margarine. To be more specific, for week 19, 31.4% chose light butter/margarine and 68.6% chose jam, jelly or honey, whereas, for week 36, 6.3% chose light butter/margarine and 93.7% chose jam, jelly or honey. This is probably a choice of better tasting spreads since jams do not contain much fat but are high in sugar. Although light butter/margarine are low in fat they are not as better tasting as jams, jellies and honey.

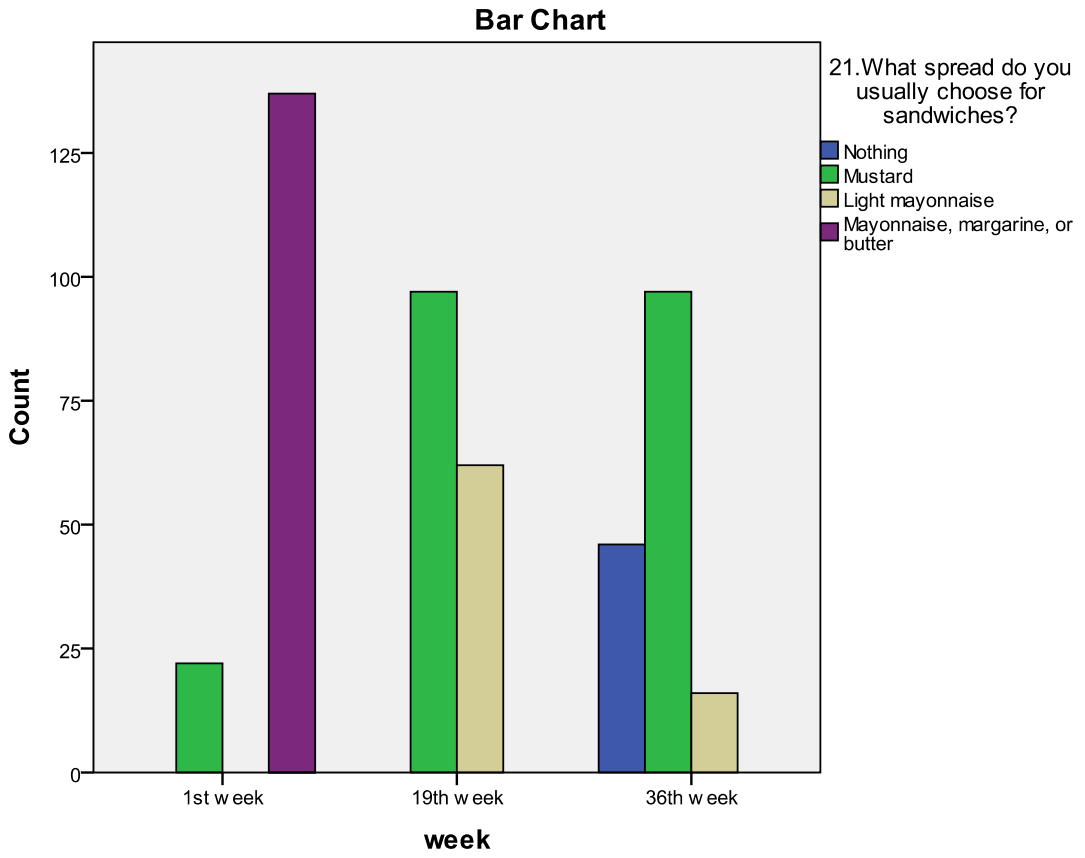
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.429. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Choice of spreads for sandwiches

The choice of spread for sandwiches indicated in the checklist A included none, mustard, light mayonnaise, mayonnaise, margarine or butter. During the first week, the choices of the respondents were either mustard (n = 22, 13.8%) or mayonnaise, margarine or butter (n = 137, 86.2%). There were more respondents choosing mayonnaise or butter because these were more popular dressings for sandwiches however mayonnaise contains saturated fat and calories that contribute to obesity. As proof of their change of lifestyle, the respondents switched to either mustard (n = 97, 61%) or light mayonnaise (n = 62, 39%) by week 19. By week 36, there were also respondents who chose not to put dressings in their sandwiches (n=46, 28.9%) or the chose mustard (n = 97, 61%) and light mayonnaise (n=16, 10.1%).

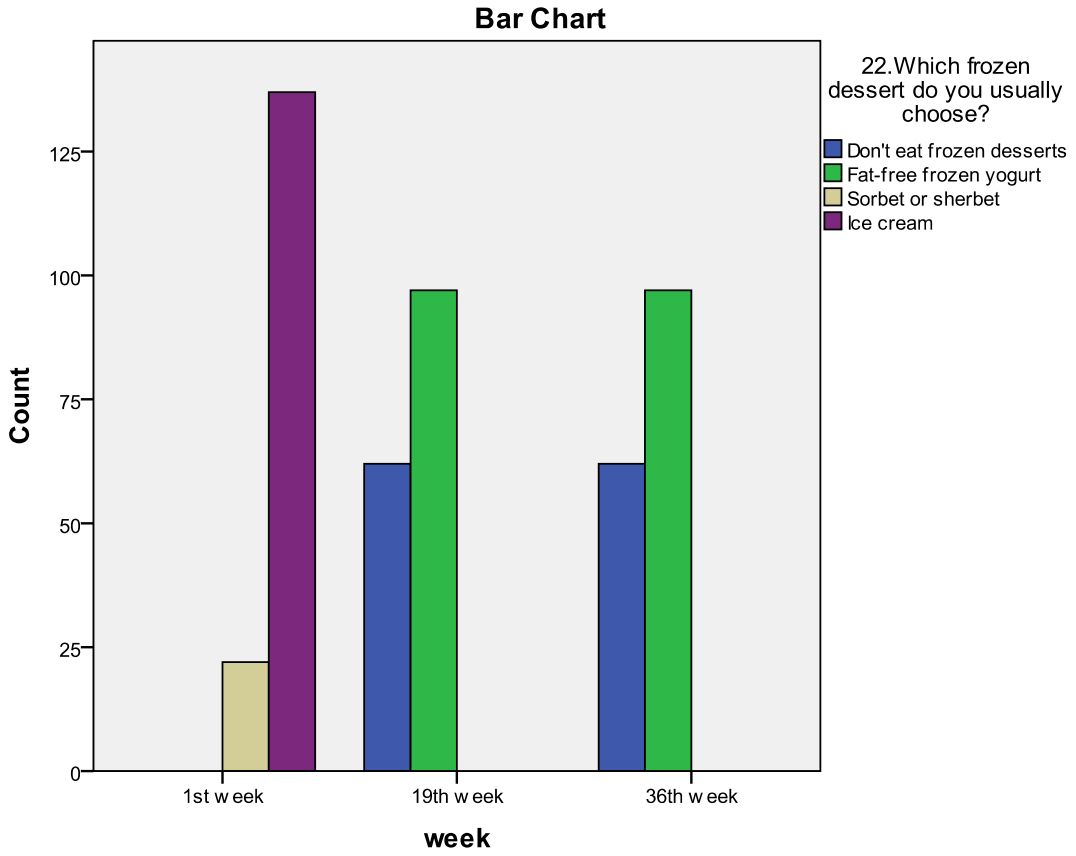
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.779. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Choice of frozen dessert

Choices of desserts in the checklist A included none, fat-free frozen yogurt, sorbet or sherbet and ice cream. As expected the 1st week, most of the respondents (n = 137, 86.2%) selected ice cream as their choice of frozen dessert and their 2nd choice was (n=22, 13.8%). It should be noted that ice cream, as opposed to sorbet or sherbet, and frozen yogurt is the creamiest and has more fat content and calories than the other two. Sorbets or sherbets have more fruit content and are less creamy than ice cream. However, there are those who were at least aware by choosing sorbet or sherbet (n = 22). By week 19, the ice cream and sorbet/sherbet were dropped from their choices and selected frozen yogurt (n = 97, 61%) or not eat frozen dessert at all (n=62, 39%). These choices were maintained up to week 36.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.801. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Frequency of caffeinated beverage intake per day

Experiments on long-term consumption of caffeine, caffeinated tea and caffeinated cola decreased the body weight in rodents, which gave rise to the supposition that the same thing would happen in humans. There is now considerable evidence in many studies in humans indicating that coffee contributes to weight loss in humans by increasing thermogenesis (Greenberg 2006).

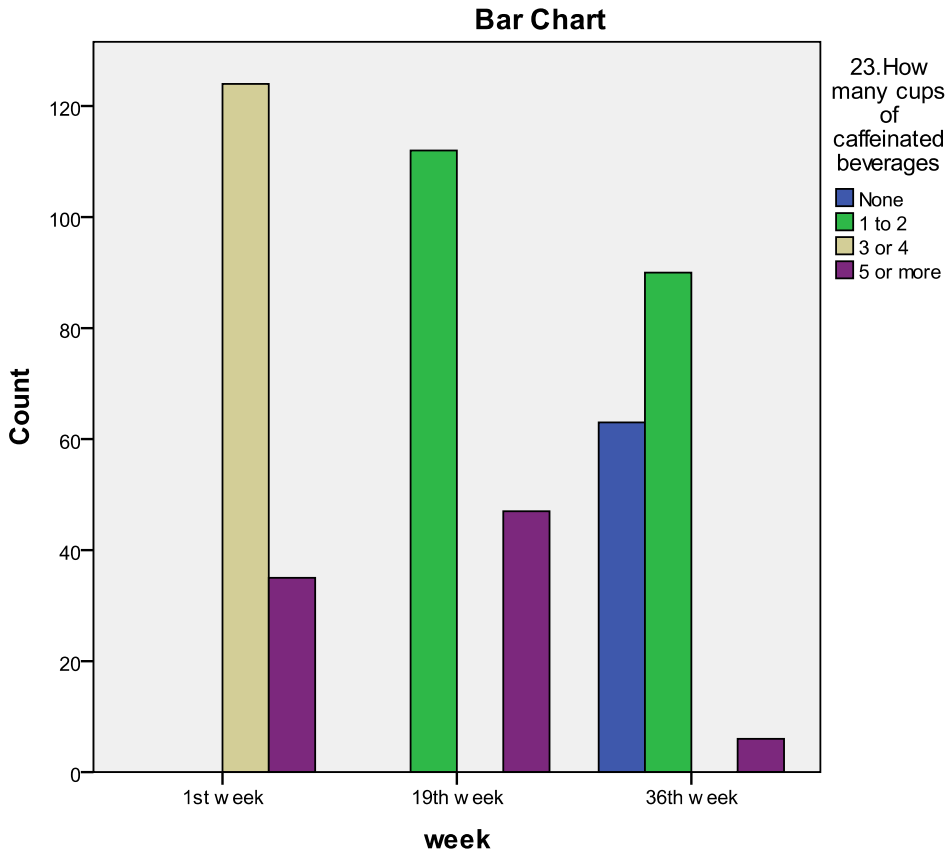
Thermogenesis is the generation or production of body heat. This happens in three ways: through exercise, through our own sympathetic nervous system which regulates body temperature, and through our diet, when food is converted to heat. Thermogenesis is a way for the body to burn up the excess, un-needed calories (Greenberg 2006).

The studies estimate that habitual consumption of six cups of coffee (or about 600 milligrams caffeine per day) resulted in increased expenditure of 100 kilocalories per day, which would indeed result in significantly lower weight. This rate is not true for all types of coffee. The link between caffeine, thermogenesis, and resultant weight loss is clear. The specific biological mechanism by which caffeine produces these effects is not yet fully known. The experiments so far indicate that, in large part, the thermogenic effect of caffeine may be due to increased heart rate and increased production of lactate and triacylglycerol. It may be years before we get a clear understanding of the mechanisms (Greenberg 2006).

It is generally agreed that consuming up to 200-300 mg of caffeine per day is safe which is equal to approximately 2-3 cups of coffee a day (preferably 2cups a day). Caffeinated beverages include coffee, tea and soft drinks among others. However, it is maintained in this study that intake of caffeinated beverages should be kept at a minimum. During the first week of measurement, the majority (n = 124, 78%) of the respondents were consuming 3 to 4 cups of caffeinated beverages per day and the rest (n=35, 22%) were consuming 5 or more a day. There was a change in the caffeine intake of the respondents by week 19 where there were 112 respondents (70.4%) who were able to reduce their caffeine beverage intake to about 1 to 2 cups per day while there was an increase for 5 or more coffee a day (n=47, 29.6%). By week 36 there were 63 respondents (39.6%) who were able to cut down totally on their daily caffeine intake, 90 respondents (56.6%) who

drunk 1-2 cups of coffee per day and 6 respondents (3.8%) who kept drinking 5 or more cups a day.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.670. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.

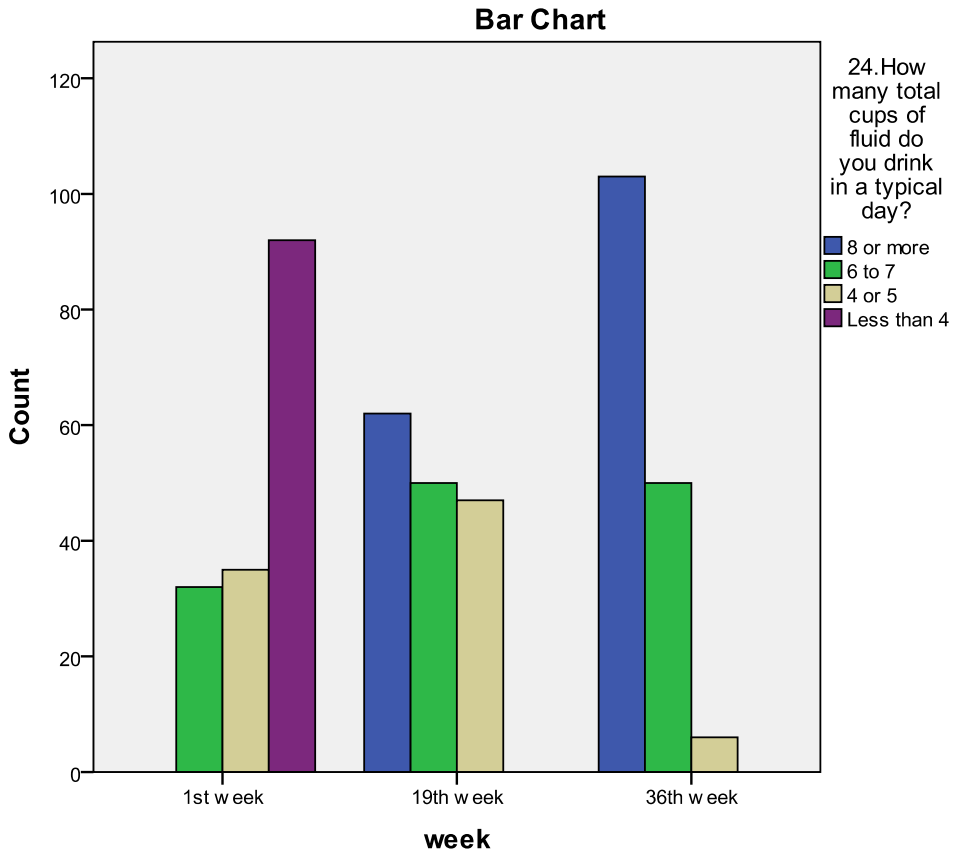


Fluid intake per day

According to DRI, the recommended Total Water for males adults is 3.7 Liter/day and for female adults 2.7Liter/day (see Appendix Checklist A). As prescribed there should be at least 8 or more cups of fluid intake per day. This helps in the normal hydration of the body although the amount depends on the lifestyle of people and their body types, at an average there should be at least 8 cups of fluid intake per day (FNB 2005). Adults need to drink at least 1.5 litres of fluid daily, even more if its hot or they are physically active. Plain water is a good source of liquid but variety can be both pleasant and healthy. Alternative sources are juices, soft drinks, tea, coffee and milk (Johnson 2000). Data from short-term experiments suggest that drinking water may promote weight loss by lowering total energy intake and/or altering metabolism. Absolute and relative increases in drinking water were associated with significant loss of body weight and fat over time. Research has shown that within 10 minutes of drinking a pint of water, the metabolism increases by as much as 30 percent. Other drinks did not show the same effect.

The water desired to drink based to this assumption is calculated with the use of the following equation weight (lbs)/ 2= ounces in water for a day (Stookey 2008). On the first week, the respondents were taking in at most 6 to 7 cups of fluid daily. The majority of them (n = 92, 57.9%) were drinking less than 4 cups of fluids daily, 22% (n=35) were drinking 4-5cups a day, 20.1% (n=32) were drinking 6-7 cups a day and 0% drunk 8 cups or more. This changed by the 19th week where 62 respondents (39%) were already drinking 8 or more cups of fluids daily and none were drinking less than 4 cups of fluids daily whereas 31.4% (n=50)drunk 6-7 cups/ day and 29.6% (n=47) drunk 4-5 cups of water/day. By week 36 there were already 103 respondents (64.8%) drinking more than 8 cups of fluids daily and 50 (31.4%) drunk 6-7 cups/day.

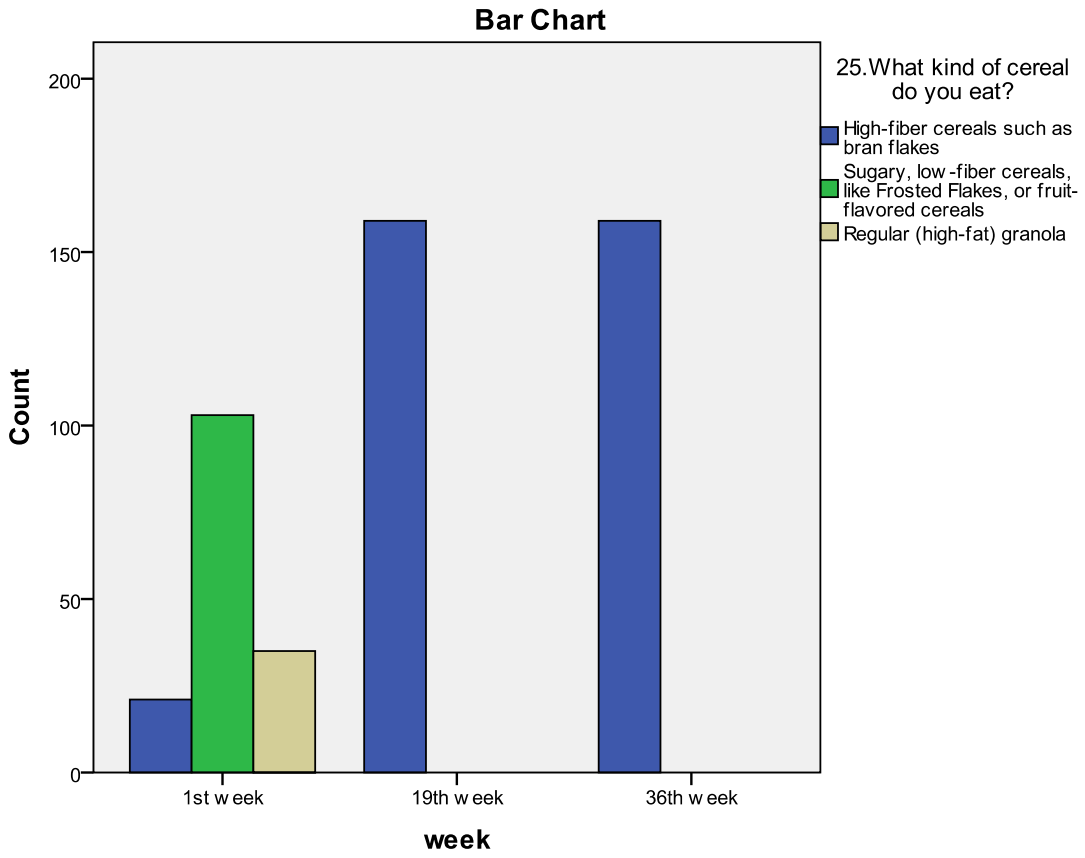
The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.722. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.


Bar Chart
120
100
80
60
40
20
0
Count
1st week
19th week
36th week
week
24.How many total cups of fluid do you drink in a typical day?
8 or more
6 to 7
4 or 5
Less than 4

Kind of cereal eaten

There are as many types of cereals as there are brands available in the market. In order to be successful in managing one's weight, one should be aware of the type of cereal included in the diet. The fiber content of the cereals can contributed to weight loss as explained above. In the checklist A, the types of cereals include regular, sugary low-fiber and high-fiber. For those wanting to manage their weight the high-fiber cereal is most recommended. However, for the respondents during the first week, the majority of them (n = 103, 64.8%) preferred the sugary but low-fiber cereals, the 22% (n=35) preferred the regular and only the 13.2% (n=21) preferred the high fiber cereals. This is probably due to the more appealing taste of these cereals so that they were more preferred. By week 19 and 36, all of the respondents (100%) from the intervention group were able to shift to high-fiber cereals. It is important to note that this is the only section in the checklist A that saw the full shift of respondents to the ideal choice. This is probably due to the fact there is less differentiation in the cereals on characteristics like taste, consistency and preparation, unlike the other food choices listed above.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.754. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



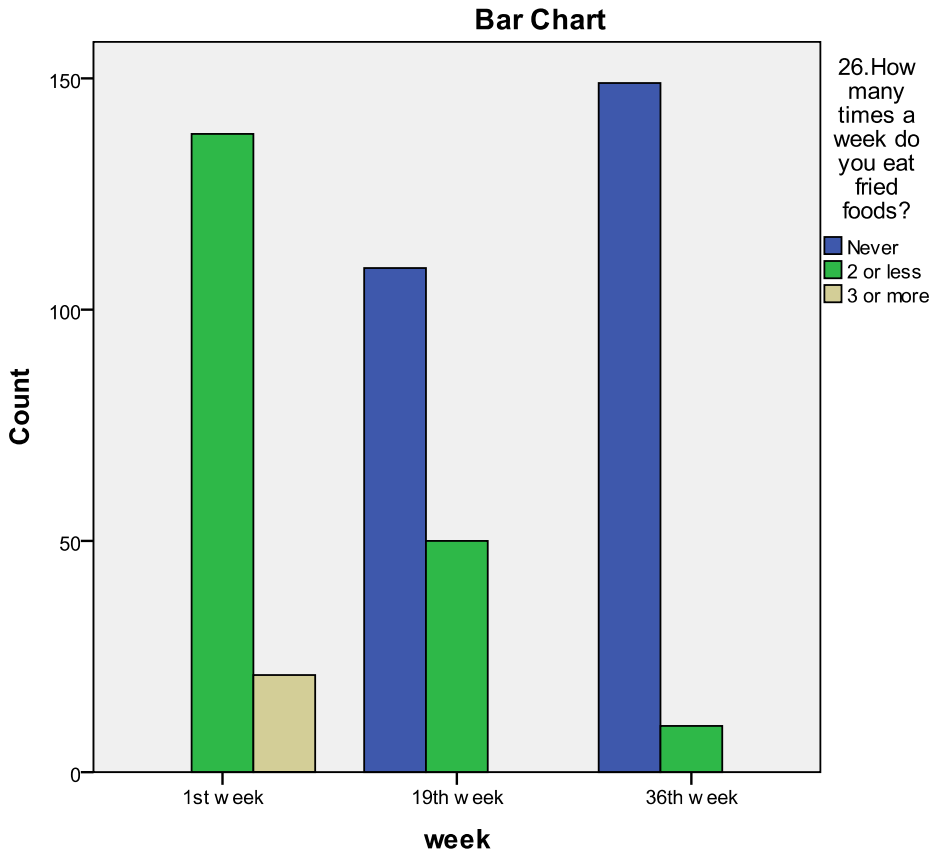
Frequency of eating fried foods

Fried foods, regardless whether they involve pork, poultry or beef or even vegetables, are infused with oils and fats when they are fried. For a weight management program, fried foods are to be avoided or kept to a minimum. Fried food was positively associated with general and central obesity only among subjects in the highest quintile of energy intake from fried food (Guallar-Castillón 2007).

Majority of the respondents in week 1 (n=138, 86.8%) reported to have been eating fried foods 2 times or less in a week and 13.2% (n=21) ate fried foods 3 or more times per week. This is probably due to the fact that it is easier to prepare fried foods and most fast food restaurants prepare their dishes as fried. However, by week 19 there were more respondents (n = 109, 68.6%) who reported to have never eaten fried foods in a week whereas those eating twice or less per week fried foods decrease to 31.4% (n=50).

Unlike in the previous item on the checklist where all of them were able to shift to the ideal cereal type by week 19 and week 36, only 149 respondents (93.7%) reported to have never eaten fried foods in a week by week 36, the other 10 respondents (6.3%) reported to have had fried foods in their diet for 2 times or less in a week. There is also a significant shift from the respondents who considered that fried foods are tasty and easy to come by. These shows that even with these considerations, the respondents were able to shift to a better choice in order for their weight management program to be successful.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.747. This means that the weeks and the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



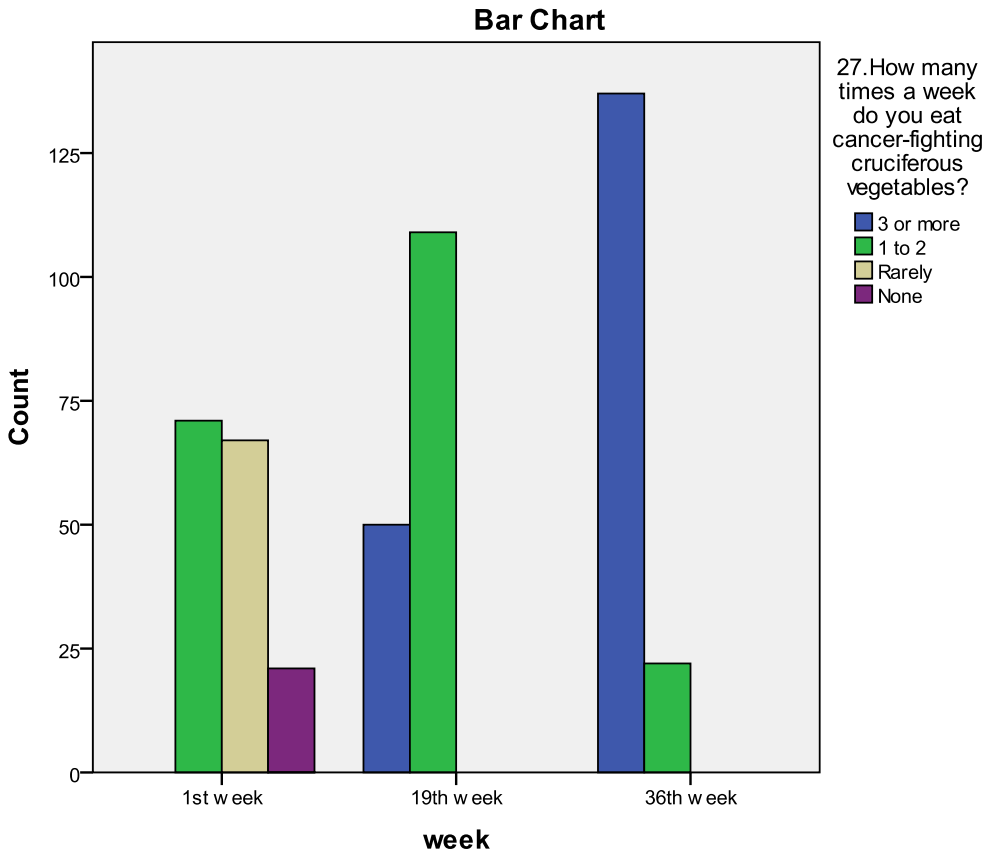
Frequency of eating cruciferous vegetables

Epidemiologic data support the association between high intake of vegetables and fruits and low risk of chronic disease. There are several biologically plausible reasons why consumption of vegetables and fruit might slow or prevent the onset of chronic diseases. Vegetables and fruit are rich sources of a variety of nutrients, including vitamins, trace minerals, and dietary fiber, and many other classes of biologically active compounds. These phytochemicals can have complementary and overlapping mechanisms of action, including modulation of detoxification enzymes, stimulation of the immune system, reduction of platelet aggregation, modulation of cholesterol synthesis and hormone metabolism, reduction of blood pressure, and antioxidant, antibacterial, and antiviral effects **(**Lampe 1999)**.** Being obese means being vulnerable to a lot of illnesses including diabetes, heart ailments and cancer (WHO 2000). That is why obese people should be more conscious of their food intake to avoid foods that contribute to the development or aggravation of this condition and to consume foods that can curb these illnesses. The last item in the checklist A is the frequency of eating cruciferous vegetables that help prevent cancer. Cruciferous vegetables include broccoli, bok choy, cauliflower, arugula and more. These, according to research, have cancer fighting components (Hien 2003).

It was seen that there was some effort from the respondents to eat cruciferous vegetables for at least once or twice a week (n = 71, 44.7%) while 21 respondents (13.2%) said that they did not eat any cruciferous vegetables for the week and 67 respondents (42.1%) said that rarely ate cruciferous vegetables. Awareness has somehow been developed among them such that by week 19, there were already 109 respondents (68.6%) who ate cruciferous vegetables at least twice a week and 50 respondents (31.4%) ate cruciferous vegetables 3 or more times per week.. By week 36, there were already 137 respondents (86.2%) who ate cruciferous vegetables for three or more times a week.

The Chi-Square Test (X^2-test) tests checks for independence. The null hypothesis is that the variables are independent, which when approximate significance is ≤0,001 is rejected. The table above shows that the null hypothesis is rejected and the table below shows that the correlation coefficient (Pearson r) equals to -0.763. This means that the weeks and

the variables of the sample are strongly (Pearson r is closed to -1) and statistically significant (p-value≤0,001) correlated.



Mean Scores and Standard Deviations for Checklist A

The likert scale answers are given both negative and positive scores taking the values from -4 to 4. When the answer does not represent a nutritious way of eating behaviour takes negative score according to its consequences to the human health. The range of the levels of scoring (Excellent, Very Good Fair, Seek Help) are chosen according to the acceptable eating habit behaviour and not. The scoring for checklist A is as follows: 65-82 is excellent, 42-64 is very good, 28-41 is good, and (-16)-27 is fair. Those who score below -16 are told to seek help regarding their weight management program. The final scoring is derived from the subtraction of the total positive scores minus the total

negative scores (the total scores of the positive and negative numbers are considered as an absolute value). As it shows at the table below, at the onset, the mean scores of the respondents from the intervention group was –34.84 (SD ± 6.76) which indicated that the respondents at that point needed to get help and probably there was the need of the behaviour modification therapy.

Statistics

		Score Week 1	Score Week 19	Score Week 36
N	Valid	159	159	159
	Missing	0	0	0
Mean		-34,84	42,93	62,15
Std. Deviation		6,756	8,492	11,196

The weight management program was considered as the help that they could get. By week 19, the mean score of the respondents improved to 42.93 (SD ± 8.49) which was interpreted as very good. This was a very significant change from the negative score that they initially got. By week 36, the mean score of the respondents was computed at 62.15 (SD ± 11.20) which was still in the very good range. It should be noted also that the minimum score garnered by the respondents by week 36 was 35 which is interpreted as good. The maximum score was 78 which were excellent meaning that there were respondents who were able to significantly improve their eating habits. The table below shows the frequency of the respondents for each scoring and their improvement through the initial assessment, dieting period with behaviour therapy and maintenance with the same therapy for the intervention group.

		scoring1	scoring19	scoring36
seek help	Count	159	0	0
	Table N %	100,0%	,0%	,0%
fair	Count	0	0	0
	Table N %	,0%	,0%	,0%
good	Count	0	97	16
	Table N %	,0%	61,0%	10,1%
very good	Count	0	62	56
	Table N %	,0%	39,0%	35,2%
excellent	Count	0	0	87
	Table N %	,0%	,0%	54,7%
Total	Count	159	159	159
	Table N %	100,0%	100,0%	100,0%

Correlation of eating habits with age and gender

The eating habits as measured by their scores in checklist A were correlated with the respondents' age and gender to determine whether these two variables are related to their eating habits. However, this did not show conclusively whether age or gender related to the improvement in the eating habits. It just describes how gender and age relate to the scores per week. The correlation tables for each week are located in Appendix 4.

Week 1 scores

The correlation of age and week 1 scores show that the younger participants scored higher as regards their eating habits (r = -0.023). However, the correlation is not statistically significant. For the given observations, it does not necessarily mean that younger participants have higher scores in checklist A or in other words have better eating habits by week 1.

Females, however, have better eating habits as seen by the correlation and the correlation in this case is significant. This is probably due to the fact that females are more self conscious and that they are more careful about what they eat than males even without the weight management program. However, since they still scored low in the checklist, this means that even if they have exerted some effort in watching what they eat and choosing

the better meals for themselves, their judgments may have been insufficient or not well informed.

Week 1 scores

	r value	Interpretation	Significance
Age	-0.023	Low Negative	0.771
Gender	0.269	Low positive	0.001

Week 19 scores

For week 19, however, older participants have higher scores. The correlation is also significant. Although this time, gender is not a significant factor in the eating habits scores. After the intervention perhaps the older participants, being more mature, have become more aware of what they eat.

Week 19 scores

	r value	Interpretation	Significance
Age	0.223	Low positive	0.005
Gender	0.074	Low positive	0.354

Week 36 scores

By week 36, age and gender did not relate with the scores. However, the participants have all improved in their eating habits scores. This probably shows that the awareness has been ingrained already and this has transcended both age and gender barriers. This means that whether young or old, male or female, they are already taking responsibility for what they eat and are determined to combat their obesity and manage their weight.

Week 36

	r value	Interpretation	Significance
Age	-0.008	Low negative	0.918
Gender	0.085	Low positive	0.286

Test of significance

The overall eating habits of the intervention group were tested using paired samples t-test to determine whether there are significant changes in their eating habits. The results from week 0 and week 18 measurements were compared, as well as week 18 and week 36 to determine whether the changes from one point of measurement to another were significant. Also results from week 0 and week 36 were compared to determine whether the results are significant from start to end.

Twenty seven questions along with the choices within these questions measured the eating habits of the respondents in the intervention group. The mean answers to these were used in determining whether there are significant changes in the eating habits of the respondents in a 36 week period of testing.

Paired Samples T-test

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Score Week 1 - Score Week 19	-77,774	10,773	,854	-79,461	-76,086	-91,035	158	,000
Pair 2	Score Week 19 - Score Week 36	-19,220	9,894	,785	-20,770	-17,670	-24,495	158	,000
Pair 3	Score Week 1 - Score Week 36	-96,994	12,875	1,021	-99,010	-94,977	-94,990	158	,000

Based on the t-test table above generated by SPSS, there is a significant difference in the eating habits of the respondents from the intervention group from week 0 to week 18, from week 19 to week 36 and from week 0 to week 36. This shows that there was a significant behaviour modification in terms of the eating habits of the respondents from the intervention group. The number of respondents changing and improving their lifestyle in terms of their food intake, type of food eaten and food proportions were quite significant (p-value≤0,001).

Most of them, by week 19 have already dropped the fatty, sugary types of food as well as cut down on their portion sizes and intakes. This would show that the respondents were

already conscious of their food intake and food portions and they were aware enough to change their old ways or in other words, modify their behaviours. This also resulted in better weight management for the respondents.

Eating Habits of the Intervention Group (grouped according to sex: male and female)

The eating habits of the intervention group was also analyzed in another perspective. This is where the males and females were grouped together and their eating habits per week were looked into to determine whether there is a difference in the eating habits of the males and females throughout the 36 weeks that the experiment was conducted. In as much as there is unequal number of males (n=76) and females (n=83) in the intervention group, the discussion will include percentage in the frequency counts. Percentages are rounded off to the nearest whole number.

Frequency of eating red meat

The males and females in the intervention group were compared as to their eating habits specifically in how frequently they ate red meat. At the onset, the majority of the males (34%) and females (53%) were eating red meat for 3 or 4 times a week. It can be seen that at least there is some level of control from the respondents as to their frequency of eating red meat. However, about 29% of the males who were eating red meat for more than 6 times a week. Which means that almost everyday, they have at least one serving of red meat in their meals. This shows that females were more conscious than the males before the intervention.

By week 18, there were already 23 males (30%) and 27 females (32%) who had excluded red meat in their daily diet. This number increased by week 36 where the majority of both males (57%) and females (85%) excluded red meat from their diet. Also, by week 18 and week 36, females either excluded red meat from their diet or ate just one or two times per week.

Proportion of red meat intake

On the first week, there were more females (28%) than males (16%) who took in 6 oz or more of red meat in their diet. However, majority of the males (42%) and females (59%) only had about 4 oz of red meat per intake. Even when the females were eating red meat less frequently, their servings were considerably large considering their calorie and fat requirements due to their condition. For the successive measurements, there was a decrease in the proportion of red meat intake for both males and females. By week 36, majority of the males (63%) and females (66%) were, if ever they eat read meat, consuming about 3 oz per serving.

Type of red meat chosen by respondents

For both groups, at the start of the experiment, their choices of red meats were either t-bone and ribs or bacon and hotdog. However, by week 18, the majority of the males (42%) and females (36%) chose loin or round cuts as their red meat. This further improved by week 36 where there are 66% of males and 63% females choosing loin or round cuts for their red meat. This shows an increased number of males and females improving their eating habits in order to be successful at the weight management program they participated in.

Frequency of eating seafood

There were participants who never included seafood in their weekly diet however, there were more who ate seafood at least once a week (males=84%; females=72%). This is probably due to the fact that they were more into red meats than into seafood and vegetables. However, this improved by week 18 and week 36 where the participants increased the frequency of eating seafood such that by week 36 there were 48 males (63%) and 55 females (66%) who ate seafood twice or more than twice a week. This is probably one of their substitutes to red meats since it can be seen at the earlier discussion

that the majority of the participants have already excluded red meat from their weekly diet.

Proportion of poultry or seafood per serving

Although the participants were not eating seafood as frequently per week, whenever they had the chance to eat, they answered that they took in 6 oz or more seafood per serving. This was not a good eating habit since, if they continue to do so, for more than 6 times per week then there is a possibility of not being able to manage their weight. Even when seafood is considered a healthy source, it should still be taken in moderation with calorie and fat content as major consideration in the proportion and frequency of intake.

There was an improvement in their seafood proportion by week 18 and week 36 where there were no more males nor females eating more than 6 oz of seafood per serving. However, for week 36, the number of males (42%) and females (36%) whose seafood intake was 3 oz did not change. Although this was the case, there was some improvement for the rest of the participants since there was a decrease in those who were taking 5 oz seafood per serving and an increase in those taking 4 oz of seafood per serving.

Removing skin from poultry

It appears that before the weight loss program, the females were already more conscious than the males since they were not eating poultry with 67% of the females responding so. Whereas the males replied that they were not removing the skin from the poultry with 50% of the males replying so. By the end of the weight management program, majority of both males (93%) and females (87%) were already removing skin from their poultry. This shows that the females were already acknowledging that poultry should still be included in the diet. There is no apparent difference in the behaviour of both genders as to removing skin from their poultry intake.

Eating legumes

There were those who were not including legumes in their diet for both males (13%) and females (13%). However, the majority of them were already including at least a half-cup serving of legumes in their diet for once or twice a week. This improved by the end of the weight loss program and the end of the weight loss maintenance program where both males and females were eating legumes for at least once a week. There is no apparent difference in the intake of legumes for both males and females since majority for both have already been eating legumes for more than three times a week.

Type of milk

The majority of the males (63%) chose 2% milk while majority of the females (40%) chose whole milk. At this stage, they are somewhat different in their choices of milk. However, by week 18 and week 36, they were both inclined to choose skim or 1% milk. This shows that at some point, the weight management program has somehow changed their choices of food specifically toward the direction of choosing healthy foods.

Cheese intake

Unlike in the choice of milk where the male and female respondents had varied choices, the majority of them (male = 87%; females = 87%) chose whole milk cheeses as opposed to low fat and fat free. However, this was gradually changed to low fat by week 18 and then fat free by week 36.

Intake of low-fat high calcium food sources

Both male and female respondents were taking in at least two servings of low-fat high calcium foods per week. By week 18, the majority of both males and females was already taking in 3 or more servings of low-fat, high-calcium foods. This situation remained through to week 36 but the number of males and females taking in 3 or more

servings of low-fat high calcium foods increased substantially, and there is no apparent difference between males and females. Choice in the number of servings on low-fat high calcium foods is more likely attributed on the intervention rather than on the gender of the participants.

Kind of bread eaten

The majority of both males (37%) and females (47%), at the onset, was choosing white bread, French or Italian as the breads that they ate most often. This is probably due to the fact that these were readily available or that these were the more popular choices. By week 18, they shifted to whole grain and then by week 36 the majority of them shifted to 100% whole wheat.

Breakfast

At the onset, the majority of both males (84%) and females (72%) was not eating breakfast, which is considered an unhealthy eating habit not only for obese people but for all. This changed by week 18 where the majority was already eating rolls and toasts with some of them eating high fiber cereals or fruits for breakfast. The weight management program has made them change their eating habit but there is no clear difference in the eating habit of males and females in terms of their typical breakfast.

Sauce in pasta

At the onset, the males were divided in their choice of pasta sauces where 71% choosing meat sauces and the remaining chose alfredo or cream based sauces. The females however were unanimous in their choice of meat sauces. By week 18, with their clear determination of weight loss, they all shifted to tomato/marinara or vegetables in olive oil. However, by week 36, there was no change in the distribution of males (n=21) and females (n=26) choosing tomato/marinara sauces and males (n=55) and females (n=57) choosing vegetables in olive oil as their pasta toppings.

Ordering Chinese

The choices of both males and females vary in terms of Chinese food. Males are distributed among chicken with steamed vegetables over white rice (21%), cold sesame noodles (29%), twice fried pork or beef (37%), and sizzling shrimp (13%). On the other hand, the females were eating chicken with steamed vegetables over white rice (40%), twice fired beef or pork (47%) and sizzling shrimp (13%). This shows that there were more males who seemed concerned with what Chinese food they order since there were those who were choosing steam and noodles. This can also be said with the females even when they were not choosing cold sesame noodles. By week 18 however, the choices of the males and females were either chicken with steamed vegetables over white rice (males = 72%; females 69%) and twice fried beef or pork (males = 28%; females = 31%). By the end of the weight maintenance period there were lesser males (n=5) and females (n=1) ordering twice-fried pork or beef. They were probably more confident in ordering so since they may have alternatives in their diet such as more high fiber fruits and cereals, etc.

Pizza Toppings

The majority of the respondents reported that before the weight loss program they were selecting extra cheese as their toppings for their pizza. It seems also that the males seemed to be more conscious of their condition at the onset because there was lesser males ordering sausage and pepperoni for their pizza toppings (males = 16% vs females = 28%) and there were males (29%) ordering plain cheese while there were no females ordering plain cheese for their pizza. However, by the end of the weight maintenance program, there were males (n=3) who were still ordering extra cheese for their pizza toppings. While there were more females (54%) than males (33%) ordering vegetables for their pizza toppings. This can show that they were different in their choice of pizza toppings but this is not a sufficient proof that they were different in their behaviours.

Snacks

Most of the respondents were snacking on potato chips (males = 42%; females = 59%) but they were able to do away with potato chips and candy bars by week 18. Unfortunately, there were still males (n = 5) and females (n = 11) who were snacking on crackers. There were more females (55%) snacking on yogurt than males (36%). This is probably due to the fact that the taste of yogurt is more appealing to females and that most of the advertisements on yogurt feature women. However, it is not part of the study to prove whether outside factors affected the eating behaviours of the respondents, as such, it is recommended that further study be done on this.

Daily servings of fruits and vegetables high in vitamin C

All through the weight management program, majority of both male and female respondents were taking only one half-cup serving of high vitamin C fruits or vegetables daily. This is probably due to the fact that they have other sources of vitamin C other than fruits and vegetables. Again this attitude is not entirely gender dependent but perhaps depends on the availability of the vitamin source.

Daily servings of fruits and vegetables high in vitamin A

At the onset, the females were more conscious than the males since all of the females were eating half-cup servings of fruits or vegetables high in vitamin A at least once a day. Although, most of the males (71%) were eating half-cup serving of fruits or vegetables high in vitamin A at least once a day, and it can be assumed that those who were not taking in these type of fruits and vegetables had other sources, this could not be proven in this study. Unlike in the intake of fruits and vegetables high in vitamin C where the respondents almost did not change their eating behaviours, the respondents in this respect were able to improve their eating habit. By the end of the weight maintenance program,

the majority of both males (72%) and females (69%) was taking half-cup servings of fruits and vegetables high in vitamin A at least twice a day.

Kind of salad dressing chosen

The females again seemed to be more conscious here since they were all choosing olive oil or canola oil based salad dressings. The males were divided between creamy or cheese based (29%) and olive oil or canola oil based salad dressings. However, the weight management program leveled the playing field perhaps by providing more information such that both males and females changed their choices to lemon juice/herb vinegar (males=63%; females=66%) and fat free or low fat (males=24%; 27%) by the end of the weight maintenance period.

Spread in Bread, Rolls or Bagels

At the onset, the respondents had varied choices in their spread for rolls, bread or bagels. However, by week 18, there were only two choices and these were jam, jelly or honey (males=70% and females=67%) or light butter or light mayonnaise (males=30% and females=33%). This behaviour continued till the end of the weight maintenance period but there were more males (n=71) and females (n=78) choosing jam, jelly or honey. This may not be gender dependent but more of a taste factor and probably calorie and nutrition factors.

Choice for sandwiches

At the onset, the females were all into mayonnaise or butter as probably the popular choice and readily available choice for sandwiches while the males are divided between mustard (n=22) and mayonnaise (n=54). By week 36, their choices were already between nothing, mustard and light mayonnaise. There is no apparent difference between males and females in their choices and it does not show that their choices are gender dependent.

Choice of frozen dessert

At the start of the weight loss program, all the females were taking ice cream for their frozen dessert. The males were divided between sorbet or sherbet (n=22) and ice cream (n=54). At the end of the weight loss period, their choices already excluded sorbet and ice cream and included fat free frozen yogurt and none or not eating any frozen dessert at all. This was a bit of a sacrifice for them but probably due to their determination, they were able to select the better alternative for their frozen desserts.

Frequency of caffeinated beverage intake per day

It was obvious that the respondents were heavy drinkers of caffeinated beverages since the majority of both males (84%) and females (72%) was drinking up to 4 cups of caffeinated beverages per day. It is interesting to note though that by the end of the weight loss period, those who were drinking five or more cups per day increased at least significantly for the males (from 16% to 28%). This was probably due to advertised anti-oxidant components of caffeinated beverages like coffee and tea. However, by the end of the weight maintenance period, majority have already reduced their intake and some even succeeded to taking none at all (males=29%; females=49%).

Fluid intake per day

The improvement in the daily fluid intake for both males and females is obvious. It can be seen that the majority was taking less than 4 cups of fluid daily (males=63% females=53%). This gradually improved such that majority of both males (63%) and females (66%) was already taking more than 8 cups of fluid daily. This is not probably gender dependent but more need dependent probably since it had been communicated to them that hydrating leads to better metabolism and better metabolism leads to better weight management.

Kind of cereal eaten

This was the most dramatic behaviour change for the participants where everyone shifted to high-fiber cereal at the end of the weight loss period. This may be attributed, not to gender, but perhaps to being able to prove that high-fiber cereals were helpful in weight loss or also to the fact that this was the easiest shift to do. High-fiber cereals are readily available in the market and these do not taste differently from the regular cereal types.

Frequency of eating fried foods

Fried foods are easy to prepare and easy to avail of since most of the ready to cook preparations are for frying. This is evident at the start of the weight loss program where the majority of the participants was eating fried foods for twice or less in a week. This shows that both males and females, at the onset, were already at least avoiding fatty foods by avoiding fried foods. They were both successful in the sense that they were able to exclude fried foods in their diet by the end of the weight loss period. The number of participants excluding fried foods in their diet further increased by the end of the weight maintenance program such that there were 71 males (93%) and 78 females (94%) no longer including fried foods in their weekly diet.

Frequency of eating cruciferous vegetables

At the onset, it would seem that both males and females do not make the effort to take care of themselves by including cancer-fighting foods in their diet. It would seem that they are only concerned with managing their weight but not their overall health as seen in their intake of fruits and vegetables high in vitamin A and vitamin C. This is evidenced by the number of males and females rarely eating (males = 37%; females = 47%) and not eating (males =13%; females=13%) cancer-fighting cruciferous foods. However, by week 18, 70% of the males were already eating cancer-fighting foods at least twice a week. The 67% of the females were also eating cancer-fighting foods for at least twice a

week. This improved by week 36 where the majority of both males (87%) and females (86%) was already eating cancer-fighting foods at least thrice a week.

Checklist C

Eating Behaviours- What influences them?

Eating can be considered a behaviour as it varies from one person to another. This behaviour can be the cause of obesity or otherwise. Since eating is a behaviour this is rooted in an individual's childhood and development since one's fondness or aversion to food is developed early on. The premise of the study is that weight management is greatly affected by changes in the eating behaviour of individuals, specifically those who participated in the experiment. As such, in order to better manage the change in the eating behaviours of individuals, it is important to first determine their behaviours. In this case, triggers of the behaviour can be determined and if these are determined, the consequences are better explained and thus the necessary intervention can readily be planned and implemented.

Checklist C of the study determined the factors that influence the eating behaviours of the participants in the intervention group. Their behaviours were measured weekly but what will be discussed here is as follows: week 1- where the initial assessment was undertaken; week 19 - which was the end of the weight loss period; week 36 – which is the end of the maintenance period. There were 20 items in the checklist. The responses were totaled which resulted in the score of the respondents. A high score is 24 for each section and this would mean susceptibility to the factors indicated in each category. Actually, any score above 24 is high and indicates that the specific behaviour needs to be modified. For example, scoring 30 in the social factors would mean that the respondent is highly affected by the following: arguing with someone, influenced by other people while they are eating, urged by someone to eat, and the feeling of being inadequate around others, such that they do not have much self-control.

The identified factors that influence eating behaviours are as follows: social, emotional, situational, rational (or thinking), and psychological. Social factors include the impact of

people like friends and relatives on the eating behaviour. These individuals and their actions toward the respondents may cause them to eat nutritionally. It cannot be denied that how a significant other regards an individual can also affect his or her eating behaviour. Emotional factors include the feelings or emotional state that a person is in that may trigger overeating or otherwise. It is often depicted in movies and it can perhaps really happen in real life that when one is depressed or feeling sad, one resorts to eating ice cream or drink alcohol. That is probably why the term comfort food was coined to label those foods that are fat, sweet, cheesy and meaty that serve as either reward for some feat or comfort for sadness. Situational factors include those situations that provide venues for people to eat more or eat less. Holidays and celebrations usually make people eat more and probably even drink more alcohol as these are served on occasions. Rational or thinking factors are usually those things that individuals think about themselves or about what other people think about them which makes them eat more or eat less. Physiological factors are body states or physical states that make one to eat more or eat less. For example, a feeling of nausea coupled with vomiting can make one to eat less. Hunger pangs on the other hand make people to eat more. The following sections discuss the perceptions of the respondents from the intervention group regarding their eating behaviours which was measured from week 1 to week 36. The respondents were asked to indicate whether the instances stated in the questionnaire were likely or unlikely to make them start eating.

Correlations (Pearson R)

Week * Section Scores

Checklist C is based on a likert scale based questions (1=very unlikely, 10 = very likely). The Pearson correlation (r) shows that there is negative correlation between the section scores and the weeks. This explains that when weeks pass by, the answers tend to move to unlike levels, instead of Like level. The sift to the unlike levels shows a positive change of the participants behaviour.

To be more specific, the **social score** is negatively correlated with the week with r=-0.604 at a significance level of $p \leq 0.001$. This means that when moving from 1st week to 18th week and from 19th week to the 36th week, the intervention group answers moved from likeliness to unlikeliness with a rate equal to 60.4%. The 60.4% is the conversion of the pattern of positive correlation between the week and the social score which is 0.604. The method of calculating this percentage is when the week increase to 100, then the social score will rise by 60.4. The same explanation exists for the other scores respectively.

The **emotional score** is negatively correlated with the week with r=-0.558 at a significance level of $p \leq 0.001$. This means that when moving from 1st week to 18th week and from 19th week to the 36th week, the intervention group answers moved from likeliness to unlikeliness with a rate equal to 55.6%.

The **situational score** is negatively correlated with the week with r=-0.673 at a significance level of $p \leq 0.001$. This means that when moving from 1st week to 18th week and from 19th week to the 36th week, the intervention group answers moved from likeliness to unlikeliness with a rate equal to 67.3%.

The **thinking score** is negatively correlated with the week with r=-0.721 at a significance level of $p \leq 0.001$. This means that when moving from 1st week to 18th week and from 19th week to the 36th week, the intervention group answers moved from likeliness to unlikeliness with a rate equal to 72.1%.

The **physiological score** is negatively correlated with the week with r=-0.739 at a significance level of $p \leq 0.001$. This means that when moving from 1st week to 18th week and from 19th week to the 36th week, the intervention group answers moved from likeliness to unlikeliness with a rate equal to 73.9%.

Social Factors

In the Checklist C on Eating Behaviours, there were 4 indicators listed under social factors that trigger eating and these are as follows: arguing or having conflict with someone, being with others when they are eating while not eating, being urged to eat by someone else, and feeling inadequate around others. A high score on this section (total means of the 4 questions the social category) would mean that the respondents are highly susceptible to the influence of others in their eating behaviour. Although the means of each question was calculated, in order to have the right results the total scoring of the social category was summed up. This would mean that they need to have more self-control in order to be successful in their weight management.

Social Factors

Indicator	Week	Mean	SD	Min	Max
Arguing or having conflict with someone	Week 1	6.52	2.25	3	9
	Week 19	6.04	1.77	3	10
	Week 36	5.02	1.42	3	9
Being with others when they are eating while not eating.	Week 1	8.16	1.67	3	10
	Week 19	6.15	1.58	3	10
	Week 36	5.04	1.42	3	9
Being urged to eat by someone else	Week 1	6.99	2.44	1	10
	Week 19	4.89	1.86	1	10
	Week 36	4.35	1.64	1	10
Feeling inadequate around others	Week 1	6.62	2.63	3	10
	Week 19	5.80	1.80	3	10
	Week 36	4.32	1.26	3	10
Score	Week 1	28.29	5.96	18	35
	Week 19	22.88	5.08	16	35
	Week 36	18.73	4.28	13	35

Arguing or having conflict with someone. The respondents, through the three measurements (week 1, week 19 and week 36) showed mean responses of 6.52 (SD= ± 2.25), 6.04 (SD= ±1.77) and 5.02 (1.42) respectively. They are likely to start eating when they argue with someone which is the usual reaction of people. It should be noted that even when the mean response and standard deviation was at the lowest by week 36, the maximum response from the participants remains high and the minimum response remains 3. This shows that although there were those who were able to change their reaction toward conflict in relation to their urge to eat, there were still those who were not

able to change. It should also be noted that by the end of the weight loss period in all the social factors, there was a response of 10 from among the participants which means that they were possibly stressed during these times that they were susceptible to others.

Being with others when they are eating while not eating. It is difficult to maintain or control food intake while being around others who are eating heartily and not mindful of their food intake. It can be seen in the average response of the participants by week 1 (M=8.16, SD= ±1.67) and their maximum response in this particular item in the checklist (10). This mean response declined by week 19 (6.15±1.58) and week 36 (5.04±1.29) along with the standard deviations. This shows that the respondents at least tried to be in control of their urges to eat especially when others are around them. The decline in the maximum response is also an evidence of the effort that the respondents put into controlling their eating behaviour.

Being urged to eat by someone else. In some cultures, it is impolite to decline when offered food by others. For some, they would rather eat anything that is offered them in order not to offend their friends or family members. The respondents seem to be in control when it comes to being urged by others to eat since their mean response rates are in the middle (week 1=6.99±2.44), (week 19=4.89±1.86), (week 36=4.35±1.64) however the responses vary from 1 to 10 which means that there are those who have strong self-control over the urges of other and still there are those who are easily persuaded by others to eat.

Feeling inadequate around others. There are individuals who eat excessively when they are around individuals who make them feel inadequate (Sixwise 2009). Although the minimum (3) and maximum (10) responses remained the same through the measurements, the standard deviations declined for each measurement. Even with the behaviour modification program, not all individuals were able to change their attitudes toward their feeling of inadequacy around others. On the other hand, there may be those who were stressed through the duration of the program that they have started to feel inadequate among others. The means (with SD) for week 1, 19, and 36 were 6.62±2.63, 5.8±1.80, 4.32±1.27, respectively.

Total score. At the onset, the mean score of the respondents was 28.29 (SD= ±5.96) with a minimum score (see **Table 36)**. The mean (±SD) was considered high but it improved as it shows in the table 1 below with the total scoring of social behaviour in the weeks 19 (22.88± 5.080) and 36 (18.73±4.276). This shows that some respondents were able to improve their eating behaviours with respect to social factors that trigger their eating or overeating. After the program, there were still individuals who need further intervention in order to improve.

Table 36-SOCIAL BEHAVIOUR

Week 1		Week 19		Week 36	
Mean	**Std. Deviation**	**Mean**	**Std. Deviation**	**Mean**	**Std. Deviation**
28.29	5.960	22.88	5.080	18.73	4.276

Emotional factors

In Checklist C, the four indicators listed under emotional factors that trigger eating are as follows: feeling bad, such as being anxious or depressed; feeling good, happy or relaxed; feeling bored or having time; and feeling stressed or excited. For some cultures, negative emotions trigger overeating while for some, negative and positive feelings both trigger overeating (Luomala, Sirieix and Tahir 2009). As such, both positive and negative emotions and conditions were included in the checklist.

Emotional Factors

Indicator	Week	Mean	SD	Min	Max
Feeling bad, such as being anxious or depressed	Week 1	7.42	2.12	4	10
	Week 19	6.10	1.20	4	10
	Week 36	4.81	1.31	3	10
Feeling good, happy or relaxed	Week 1	4.13	2.04	1	7
	Week 19	4.21	1.95	1	7
	Week 36	3.79	1.78	1	7
Feeling bored or having time on my hands	Week 1	5.33	3.13	2	10
	Week 19	4.20	2.06	2	9
	Week 36	3.55	1.55	2	9
Feeling stressed or excited	Week 1	8.16	1.86	4	10
	Week 19	6.67	1.88	3	10
	Week 36	4.90	2.08	3	10
Score	Week 1	25.04	6.07	15	31
	Week 19	21.18	3.95	14	31
	Week 36	17.05	4.41	10	31

Feeling bad, such as being anxious or depressed. Anxiety and depression are common causes of overeating. Anxious, depressed, or sad people often turn to sugars and fatty food for comfort (Sixwise 2009). The first week showed a moderately high mean response of 7.42 (SD= ±2.12) which declined by week 19 (6.10 ± 1.197) and week 36 with a mean response of 4.81 (SD= ±1.31). It can be seen that the standard deviation for week 1 was higher than week 36 which means that the responses of the participants were

scattered unlike in week 36 where the standard deviation is lower which shows that the responses are closer to the mean.

Feeling good, happy or relaxed. The mean responses through the measurements were moderately low which means that this particular emotion does not likely affect or trigger eating from the participants. The means (with SD) for week 1, 19, and 36 were 4.13±2.04, 4.21±1.95, 3.79±1.78, respectively.

Feeling bored or having time on my hands. This emotion or state can be considered as one of the factors for overeating and this can be showed from the results. The mean responses (with SD) were as follows (week 1=5.33±3.131; week 19=4.20±2.065; week 36=3.55±1.549). This shows that not all participants were affected by boredom but there were also those who were triggered by boredom to eat. Nevertheless, based to the scoring there was an improvement on the behaviour.

Feeling stressed or excited. Stress is a big contributory factor to overeating of the respondents as seen in their mean response 8.16 (SD= ±1.86) which is in the very likely side of the spectrum. However, this lowered by the end of the weight loss period with a mean 6.67±1.881 and the weight maintenance period with a mean of 4.90± 2.08. Which means that there are still those who are affected by stress

Total score. In this particular section, the mean score of the respondents is 25.04 (SD= ±6.07) which is considered high and that they need to have additional intervention aside from the weight management program. However, the mean scores were significantly lowered by week 19 with a mean 21.18±3.954 and by week 36 with a mean of 17.05 (SD= ±4.41). The efforts of the participants in controlling their urge to eat as triggered by happy or sad emotions can be said to have improved. **Table 37** shows the means of the total scoring for the emotional behaviour.

Table 37- EMOTIONAL BEHAVIOUR

Week 1		Week 19		Week 36	
Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
25.04	6.067	21.18	3.954	17.05	4.406

Situational Factors

In the Checklist C, the situational factors that trigger eating are as follows: seeing an advertisement for food or eating and wanting to eat; passing by a bakery, cookie shop or other enticement to eat, being involved in a party, celebration, or special occasion; and eating out. This section determines whether the above stated situations affect the eating behaviours of the participants.

Seeing an advertisement for food or eating and wanting to eat. It shows that the respondents were not highly likely affected by the end of their behaviour modification treatment by advertisements for food as evidenced by their mean responses (week 1=6.69±2.83; week 19=5.93±2.15; week 36=4.71±1.74). It shows a seeming improvement in their behaviours since the mean responses have decreased as well as the standard deviations.

Passing a bakery, cookie shop or other enticement to eat. Similar with the previous situation (seeing and advertisement for food), passing by a bakery only moderately affects the eating behaviour of the respondents. However, the mean responses declined along with their respective standard deviations (week 1=6.31±2.79; week 19=5.17±2.072; week 36=4.07±1.70) throughout the treatment.

Eating out. Eating out with friends and family is different from eating from the confines of one's home. The difference is that in one's home the food intake can be controlled whereas when outside, one is dependent on the servings offered by the restaurants or one could no longer be much in control any more. Another difficulty for those who are on a strict diet when eating out is that they tend to forget that the follow a diet plan the follow and often times order more than they are supposed to. However, for this set of respondents they were able to show improvement since the decline in their mean response was from 8.98 (SD= ±1.06) at week 1 to 6.65 (SD= ±1.76) at week 19 and then 5.06 (SD= ±1.85) at week 36. Although the mean responses decreased, the standard deviations increased.

Total score. As seen in the mean responses in the four situations that can trigger eating, the mean scores of the respondents also declined along with their standard deviations (week 1=28.21±4.69; week 19=23.25±4.36; week 36=18.23±4.42). This indicates that there was an improvement for those who manage to modify their eating habits and control themselves regarding overeating. **Table 38** shows analytical the means and SD of this group.

Table 38-SITUATIONAL BEHAVIOUR

Week 1		Week 19		Week 36	
Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
28.21	4.688	23.25	4.362	18.23	4.421

Thinking Factors

Thinking factors include those situations where the respondents are triggered to eat because of what they think of others or what they think of themselves or the situations they are in. The situations listed in the checklist C are as follows: making excuses to myself about why it's acceptable to eat, berating myself for being so far or unable to control my eating; worrying about others or about difficulties I am having, and thinking about how things should or shouldn't be.

Making excuses to myself about why it's OK to eat. People who are avoiding further weight gain and trying to manage their weight often find themselves in this situation. One example is when they are in restaurants and they are faced with delicious desserts or enticing dishes, they rationalise to themselves that it is not a sin to eat just for once. This is sometimes a reward issue since they see dieting as a punishment. Another example is when they are shopping for their meals and they see bags of potato chips or candies and the like. In order for them to give in to these cravings, they would often think "just this once" and would go on like this every time they are in groceries. The respondents showed a high likelihood of being influenced to eat with their excuses (M=8.98±1.74) at the start of the weight loss period. However, this declined by week 19 and week 36 (7.36±1.39, 5.03±1.83, respectively) but it should be noted that the standard deviation at week 36 is higher than that of week 1.

Berating myself for being so far or unable to control my eating. This kind of perception possibly leads to anxiety that is why this is one trigger for eating. The respondents also had high likelihood of eating with this kind of thinking as they have indicated in the checklist C with a mean response of 8.35 (SD= ±1.43). It is interesting to note that one of the lowest standard deviations is in week 19 of this item (6.69±0.86). There is a moderate likelihood for the respondents to eat due to this kind of thinking and they are almost in agreement with this. The improvement continued even at the maintenance period and this is obvious from the means of the scoring which it was 5.91 ± 1.425. This means that there were those who were not able to exercise control over their eating when they were unable to control their eating and berate themselves in the process.

Worrying about others or about difficulties I am having. Undergoing this weight loss and weight management program has possibly contributed to worries especially on weight gain and the pressure of weight loss. The mean responses (with SD) were as follows (week 1=8.01±1.13; week 19=7.16±0.80; week 36=5.46±1.40). This showed that the respondents had possibly felt the pressure and had possibly been triggered to eat due to these worries. However, by week 36, they had started to take control over their urges.

Thinking about how things should or shouldn't be. The respondents mean (with SD) response by week 1 (8.02±1.67) has declined by week 19 (7.38±1.68) and even further for week 36 (5.50±2.14) but the standard deviation for week 36 is higher than the previous weeks. This is possibly explained by the minimum (2) and maximum (10) responses which showed that even when there were respondents who were able to control their urge to eat when they started worrying about how things should or shouldn't be there were still those who couldn't help themselves (see Appendix C, table 4).

Total score. In this section, the scores are high for weeks 1 (mean=33.36± 3.93) and 19 (mean=28.59±2.92), although there was an improvement by week 19. However, they were able to reduce it to a mean score of 21.91 (SD± 6.08) where the minimum recorded score was 12 but the maximum recorded score was 39. From the 5 factors, the thinking factor ranked the highest maximum score (for min/ max scores see Appendix C). This showed that this is the area in which the respondents concerned should seek help with.

Situational Factors

Indicator	Week	Mean	SD	Min	Max
Seeing an advertisement for food or eating and wanting to eat	Week 1	6.69	2.83	2	9
	Week 19	5.93	2.15	2	9
	Week 36	4.71	1.74	2	9
Passing by a bakery, cookie shop, or other enticement to eat	Week 1	6.31	2.79	1	9
	Week 19	5.17	2.07	1	9
	Week 36	4.07	1.70	1	9
Being involved in a party, celebration, or special occasion	Week 1	6.23	2.19	1	9
	Week 19	5.50	2.16	1	9
	Week 36	4.39	1.69	1	9
Eating out	Week 1	8.98	1.06	7	10
	Week 19	6.65	1.76	4	10
	Week 36	5.06	1.85	3	10
Score	Week 1	28.21	4.69	20	36
	Week 19	23.25	4.36	17	36
	Week 36	18.23	4.42	13	36

Table39 below shows the mean scores for this group.

Table 39- THINKING BEHAVIOUR

Week 1		Week 19		Week 36	
Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
33.36	3.927	28.59	2.921	21.91	6.082

Thinking Factors

Indicator	Week	Mean	SD	Min	Max
Making excuses to myself about why it's OK to eat	Week 1	8.98	1.74	4	10
	Week 19	7.36	1.39	4	10
	Week 36	5.03	1.83	3	10
Berating myself for being so far or unable to control my eating	Week 1	8.35	1.43	5	10
	Week 19	6.69	0.86	5	10
	Week 36	5.91	1.42	3	10
Worrying about others or about difficulties I am having	Week 1	8.01	1.13	6	10
	Week 19	7.16	0.80	6	10
	Week 36	5.46	1.40	4	9
Thinking about how things should or shouldn't be	Week 1	8.02	1.67	6	10
	Week 19	7.38	1.68	5	10
	Week 36	5.50	2.14	2	10
Score	Week 1	33.36	3.93	27	39
	Week 19	28.59	2.92	25	39
	Week 36	21.91	6.08	12	39

Physiological Factors

In the Checklist C, the indicators for physiological factors that trigger eating were as follows: experiencing pain or physical discomfort; experiencing trembling, headache, or light headedness associated with little eating or too much caffeine; experiencing hunger pangs or urges; and experiencing hunger pangs or urges to eat, even though had eaten

already. In so far as the respondents were concerned, these physiological factors are only moderately high triggers of their eating except for their experiencing of hunger pangs on the first week as they probably went on to satisfy them. The results of the survey are discussed in the following sub-sections.

Experiencing pain or physical discomfort. The respondents showed improvement in controlling their urge to eat from week 1 to week 36 however, the minimum (5) and maximum (10) response remained the same throughout (see Appendix Checklist C) whereas mean responses (with SD) were as follows (week 1=6.92±1.22; week 19=6.39±1.52; week 36=5.68±1.03). This showed that the respondents learned to be able to control eating when they felt pain or physical discomfort.

Experiencing trembling, headache, or light headedness associated with no eating or too much caffeine. This factor, like the rest of the factors in this section, is only likely to influence the eating of the respondents as seen in the mean response for week 1 (7.49±2.33) week 19 (6.26±1.48) and week 36 (5.21±1.46). The decrease in the mean responses from week 1 to week 36 showed improvement in how they control their eating when they feel trembling, headache and the like.

Experiencing hunger pangs or urges. This had the highest mean response from the participants for the first week with a mean of 8.18 (SD= ±1.98). This shows that this has a high likelihood of triggering the eating of the participants. However, this was reduced to a mean of 6.93(SD±1.38) by week 19 and 5.48 (SD= ±1.72) by week 36 showing an improvement for some of the respondents in controlling their urges.

Experiencing hunger pangs or urges to eat, even though I have eaten recently. The mean responses from week 1 (7.55±2.39) to week 19 (5.72±1.75) and to week 36 (4.59±1.28 have also decreased in this section along with their standard deviations. This has the lowest mean response by week 36 (mean=4.59±1.28) as compared to the other physiological factors that trigger eating from among the respondents. The standard deviation (1.28) is moderately low which showed that they responses were near toward the mean such that the respondents more or less have the same behaviour toward this.

Total score. Physiological factors are somewhat difficult to avoid or control since there are corresponding physical manifestations of hunger that need to be addressed by individuals. However, there is a considerable improvement in the control of the participants in terms of the physiological factors that urge them to eat. This is evidenced by the mean responses recorded for week 1, week 19 and week 36 (30.13 ±3.31, 25.30±2.53. 20.96±4.19, respectively). **Table 40** shows the total means and SD of the Physiological Behaviour.

Table40- PHYSIOLOGICAL BEHAVIOUR

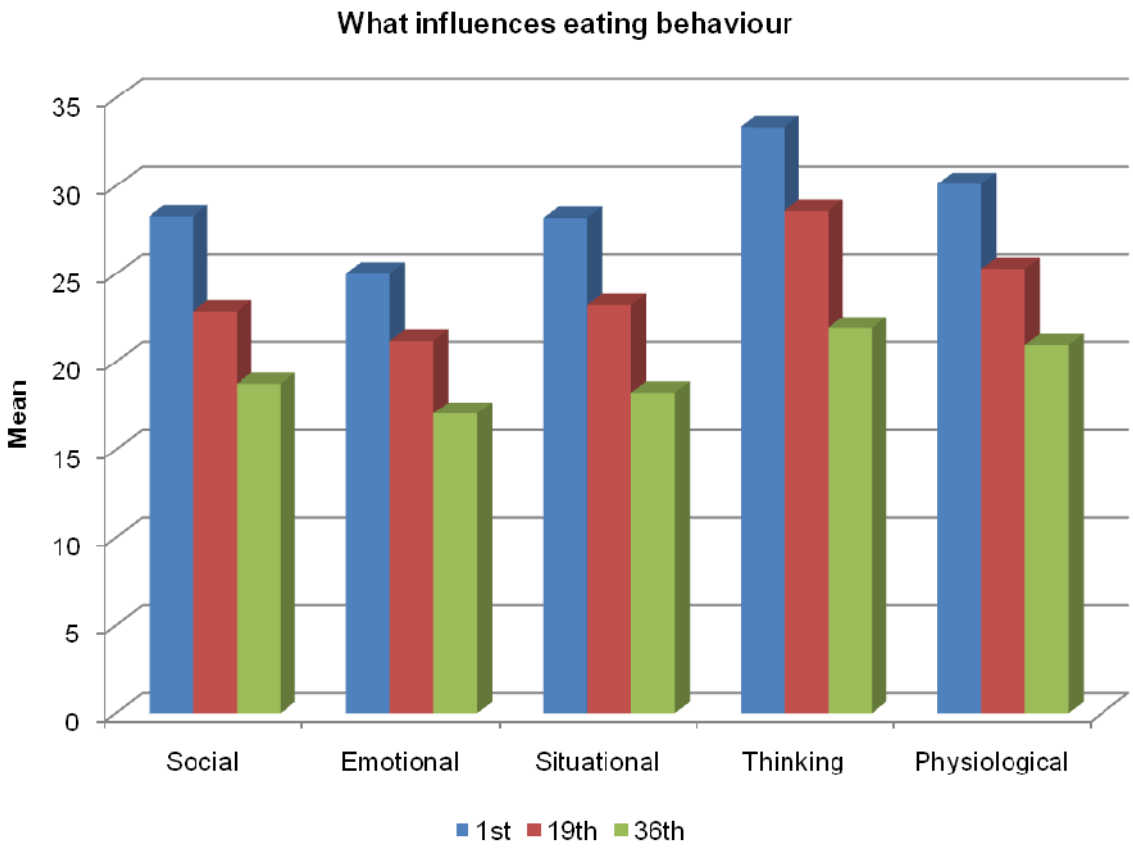
Week 1		Week 19		Week 36	
Mean	**Std. Deviation**	**Mean**	**Std. Deviation**	**Mean**	**Std. Deviation**
30.13	3.315	25.30	2.530	20.96	4.190

Physiological Factors

Indicator	Week	Mean	SD	Min	Max
Experiencing pain or physical discomfort	Week 1	6.92	1.23	5	10
	Week 19	6.39	1.15	5	10
	Week 36	5.68	1.03	5	10
Experiencing trembling, headache, or light headedness associated with no eating or too much caffeine	Week 1	7.49	2.34	3	9
	Week 19	6.26	1.48	3	9
	Week 36	5.21	1.46	3	9
Experiencing hunger pangs or urges	Week 1	8.18	1.98	5	10
	Week 19	6.93	1.38	5	10
	Week 36	5.48	1.72	3	10
Experiencing hunger pangs or urges to eat, even though I have eaten recently	Week 1	7.55	2.39	4	10
	Week 19	5.72	1.75	3	10
	Week 36	4.59	1.28	3	10
Score	Week 1	30.13	3.31	22	35
	Week 19	25.30	2.53	20	35
	Week 36	20.96	4.19	16	35

Figure 8 shows in a bar chart the improvement of the intervention group with the behaviour modification on the factors influencing the eating behaviour.

Figure 8


What influences eating behaviour
Mean
35
30
25
20
15
10
5
0
Social
Emotional
Situational
Thinking
Physiological
1st
19th
36th

PHYSICAL ACTIVITY BEHAVIOURAL MODIFICATION RESULTS (CHECKLISTS B & D)

Checklist B

Physical Activity Results

In Checklist B we examined how often (frequency), how long (duration) and how hard (intensity) the intervention group performed physical activity on the 1st (assessment), 19th (end of weight loss period) and 36th (end of maintenance) week. Furthermore we determined the physical activity index (sedentary, low activity, moderate, high activity).

How often (frequency) do you exercise?

The mean (± one standard deviation) physical activity frequency for one, two, three and four times per week reported on 1st week was 27.8%, 51.3%, 20.9% and 0% respectively. For the 19th week the mean physical activity frequency for one, two, three and four times per week was 0%, 11.4%, 82.3% and 6.3% respectively. For the 36th week the mean physical activity frequency for one, two, three and four times per week was 0%, 10.8%, 79.1% and 0% respectively.

Frequency (times per week)	Week (%)		
	1st	19th	36th
Once	27.8	0.0	0.0
Twice	51.3	11.4	10.8
Three times	20.9	82.3	79.1
Four times	0.0	6.3	10.1

How long (duration) do you exercise?

The mean (± one standard deviation) physical activity duration of exercise for one, two, three and four times per week reported on 1st week was 3.8%, 42.4%, 49.4% and 4.4% respectively. For the 19th week the mean physical activity duration for one, two, three and four times per week was 0%, 11.4%, 41.1% and 47.5% respectively. For the 36th week the mean physical activity duration for one, two, three and four times per week was 0%, 10.8%, 42.4% and 46.8% respectively.

Duration (minutes)	Week (%)		
	1st	19th	36th
5 to 14	3.8	0.0	0.0
15 to 29	42.4	11.4	10.8
30 to 44	49.4	41.1	42.4
45 to 59	4.4	47.5	46.8

How hard (intensity) do you exercise?

The mean (± one standard deviation) physical activity intensity for one, two, three and four times per week reported on 1st week was 8.2% very low, 63.3% low, 28.5% moderate and 0% heavy respectively. For the 19th week the mean activity intensity for one, two, three and four times per week was 0%, 0.6%, 69.6% and 29.7% respectively. For the 36th week the mean physical activity intensity for one, two, three and four times per week was 0%, 0.6%, 69% and 30.4% respectively

Intensity	Week (%)		
	1st	19th	36th
Very low	8.2	0.0	0.0
Low	63.3	0.6	0.6
Moderate	28.5	69.6	69.0
Heavy	0.0	29.7	30.4

Activity Index

Activity Index	Week (Mean)		
	1st	19th	36th
Men	11.43	33.00	32.92
Women	10.84	31.73	33.07
Total	11.12	32.34	33.00

If your activity index is:	Your estimated level of activity is:
Less than 15	sedentary
15-24	somewhat active
25-40	moderate active
41-60	active
Over 60	very active

The mean (± one standard deviation) for physical activity index for men and women the 1st week was 11.43 and 10.84 (sedentary) respectively. For the 19th week the mean physical activity index for men and women was 33 and 31.73 respectively (moderately active) and for the 36th week the mean physical activity index for men and women was 32.92 and 33.07 (moderately active) respectively.

The correlation table below shows that all exercise habits are positively correlated to the weeks and the between each other. When there is a positive correlation between two variables means that when one variable is increased, the other variable increases analogically to the Pearson R figure. For insance, the pearson correlation 0,591 between the freqency of exercise and week means that as weeks go by, people of the sample exercised more. The same happens with the rest exercise factors (how long, how hard and activity index). All correlations are strong and statistically signifigant (p-value≤0,001).

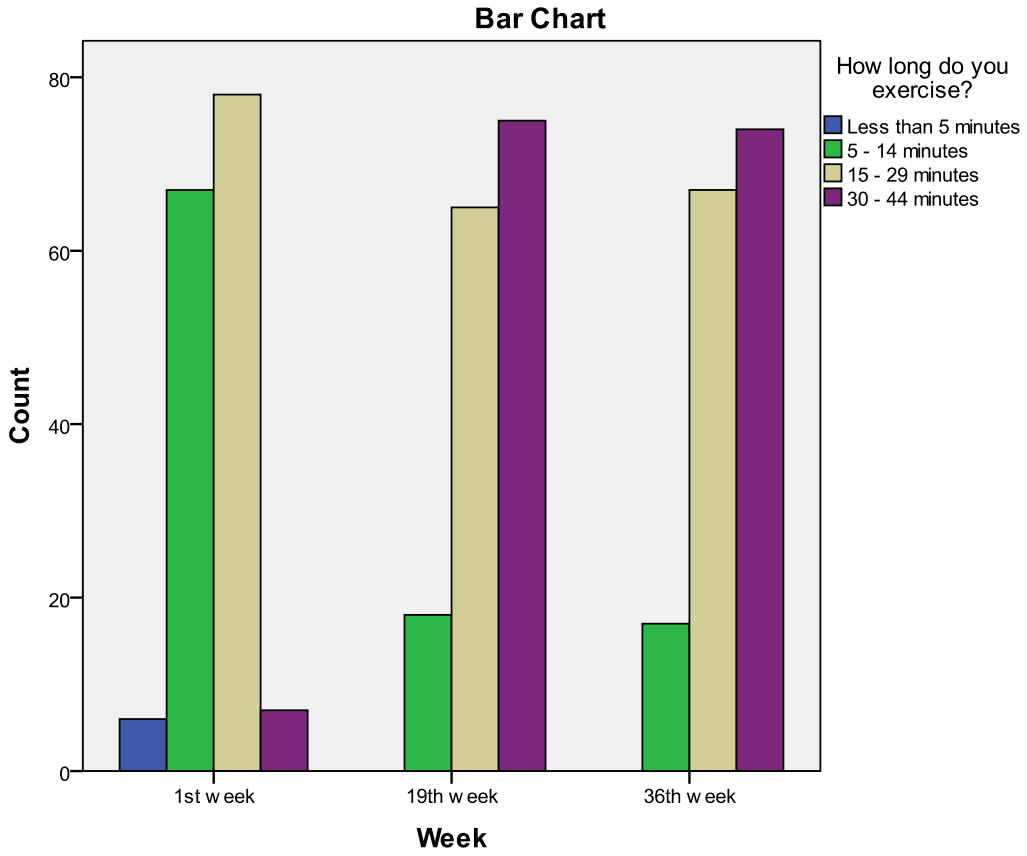
Checklist B is based on a likert scale based questions (less than 15 = sedentary, 15-24 = low active, 25-40 = moderate active, 41-60 = active and over 60 = high active). The Pearson correlation (r) shows that there is negative correlation between the section scores and the weeks. This explains that when weeks pass by, the answers tend to move to <active and high active> levels, instead of <sedentary> level. The shift to the <active and high active> levels shows a positive change of the participants behaviour.

When people of the intervention group were asked how often they exercise during the week, in the 1st week 51,3% answered that they used to exercise once a week and 20,9% twice a week. The rest of them (27,8%) said that they exercise less than once a week. In

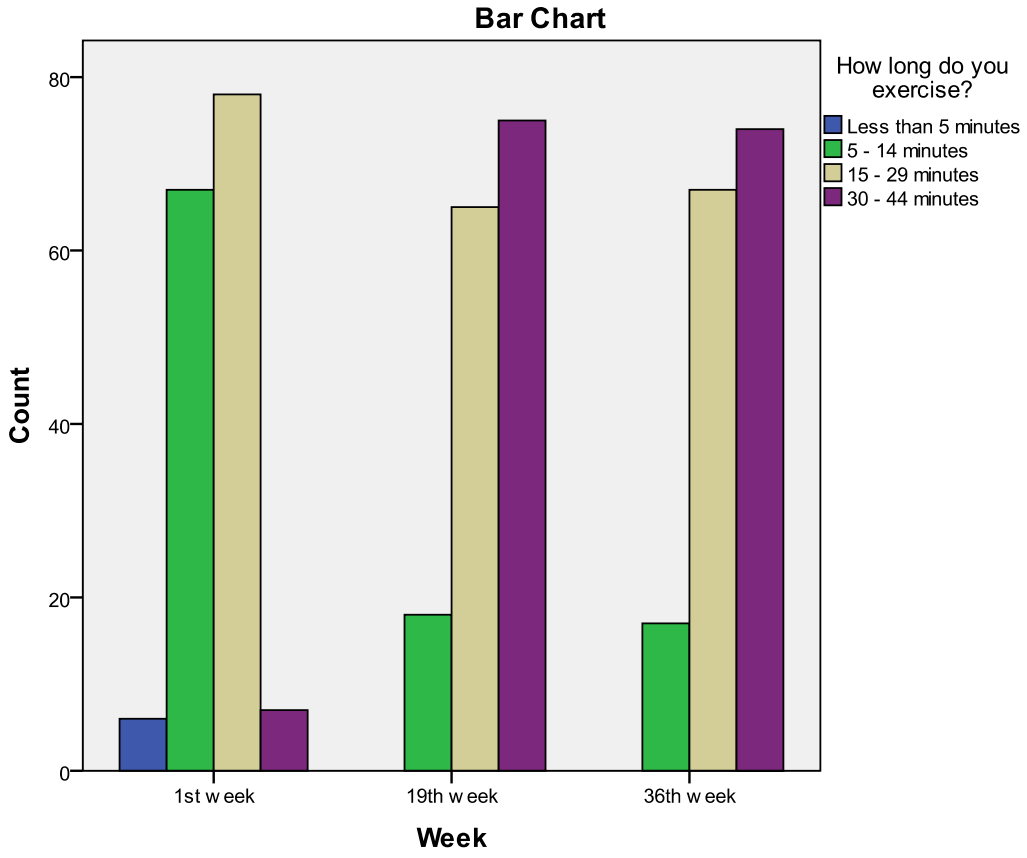
the 19th week, all intervention group excericed more than once a week, with the majority of them (82,3%) saying that they use to exercise twice a week. In the last week answers of 3 times a week increased to 10,1%.

The cross tabulation table below shows exercise habits changes through the weeks according to the duration of exercise during a week. In the 1st week, the majority of people used to exercise between 5-14 minutes per day (42,4%) and between 15-29 minutes per day (49,4%). It is interesting to state that in the 19th week people used to exercise more with the 47,5% of the intervention group stating that they use to exercise between 30-44 minutes. In the results of the last week (36th week) were on the same levels with those of the 19th week where 46,8% stated that they exercise 30-44 minutes per day.

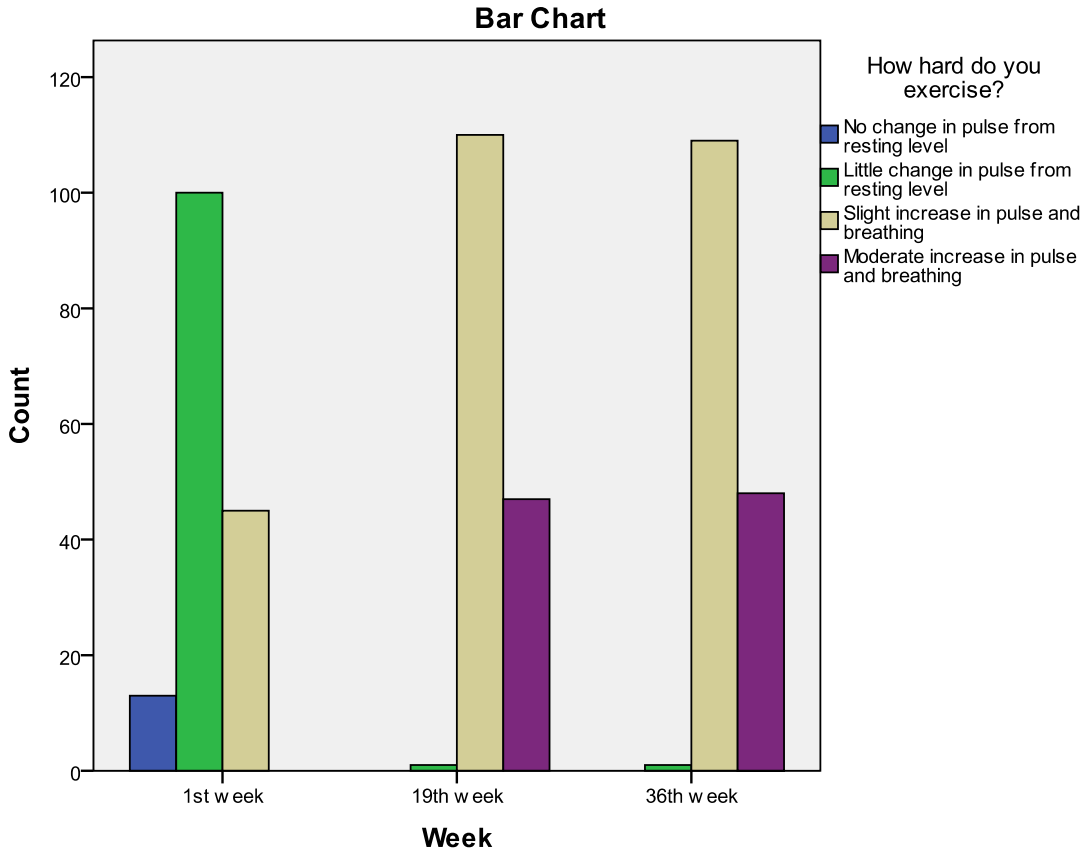
To be more specific, the 1st week, 100% of the sample answered that they exercise less than 5 min. per day, 0% the 19th week and 0% the 36th week. It is interesting to see that by the 19th week 31% exercise 15-29 min. per day and 48.1% exercise 30-44 min. per day. 13,8 By the end of the maintenance program 31,9% exercise 15-19 min. per day and 47,4% 30- 44 min. per day.



When people of the intervention group were asked how long do they do exercise per session, in the 1st week 42,4% answered that they used to exercise 5-14 minutes per session and 49,4% 15-29 minutes per session and 4,4% 30-44 minutes session. In the 19th week, 41,1% of the intervention group excercised 15-29 minutes per session and 47,5% exercised 30-44 minutes per session. In the last week (36th) 42,4% exercised 15-29 minutes per session and 46,8% exercised 30-44 minutes per session.

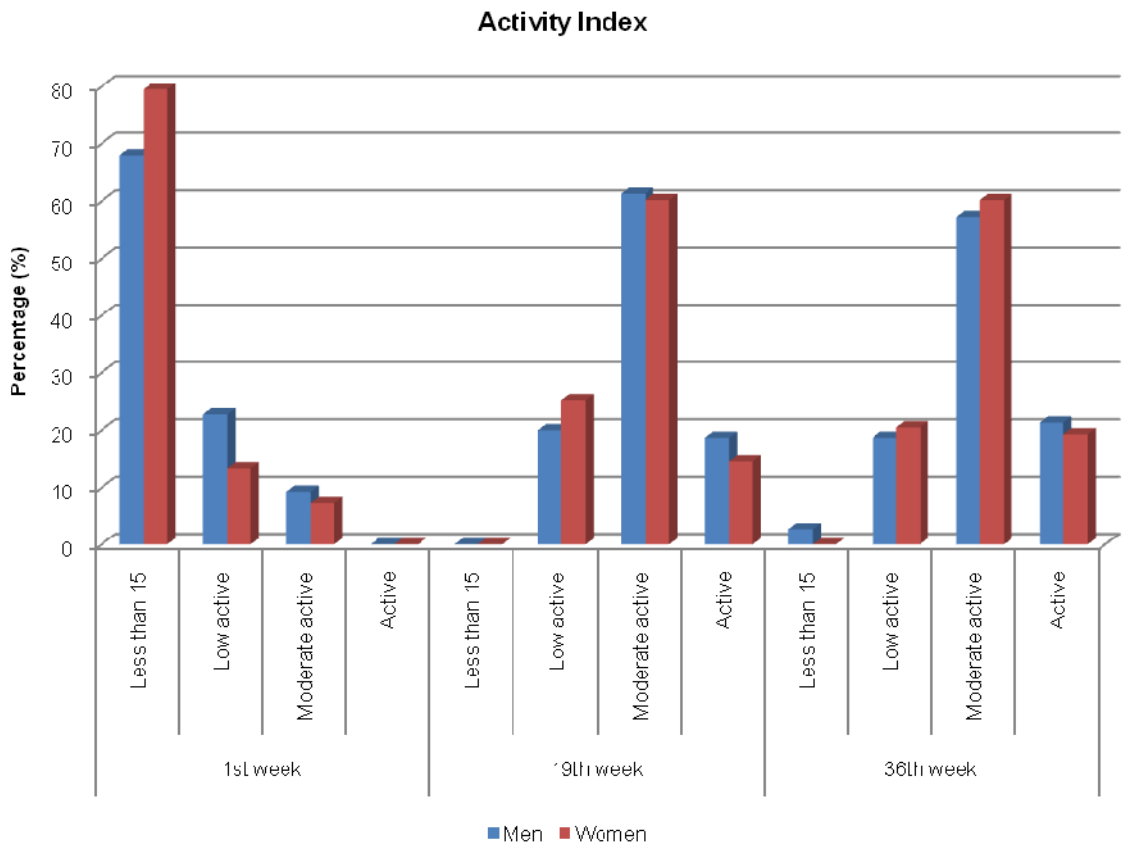


When people of the intervention group were asked how hard do they exercise per session, in the 1st week 8,2% had no change in pulse from resting level whereas nobody had modrate increase in ulse and breathing. In the 19th week, 69,6% had slight increase in pulse and breathing and 29,7% had moderate increase in pulse and breathing. In the last week (36th) 55,7% had slight increase in pulse and breathing and 20% had moderate increase increase in pulse and breathing.



Activity index

The cross tabulation table below shows the activity index level and how habits changes through the weeks according to the frequency, intensity and duration of exercise during a week. In the 1st week, the majority of people used to be sedentary (74,15) and nobody had an active activity index. It is interesting to state that in the 19th week people used to have an activity index of moderate active at 61,4%. The results of the last week (36th week) remained about the same as the 19th week as 58,9% had a moderate activity index.



Checklist D

Physical Activity Results In Checklist D we examined what influences the Physical Activity on the intervention group on the 1st (assessment), 19th (end of weight loss period) and 36th (end of maintenance) week.

The following percentages (by week) reported that they did not have time due to their busy schedule to do physical activity: 1st week – 75.9%, 19th week – 84.2%, and 36th week – 81.4%.

On the other hand on the 1st week 24.1%, 15.8% on the 19th week and 18.6% on the 36th week reported that time was not a factor for them.

1. week * No time in my busy schedule

			No time in my busy schedule		
			Yes	No	Total
week	1st	Count	120	38	158
		% within week	75.9%	24.1%	100.0%
	19th	Count	133	25	158
		% within week	84.2%	15.8%	100.0%
	36th	Count	133	25	158
		% within week	84.2%	15.8%	100.0%
Total		Count	386	88	474
		% within week	81.4%	18.6%	100.0%

On the 1st week 63.3%, 19th week 7% and 36th week 0% reported that they had no energy to do physical activity. On the other hand on the 1st week 36.7%, 93% on the 19th week and 100% on the 36th week reported that energy was not a factor for them.

2. week * No energy

			No energy		
			Yes	No	Total
week	1st	Count	100	58	158
		% within week	63.3%	36.7%	100.0%
	19th	Count	11	147	158
		% within week	7.0%	93.0%	100.0%
	36th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
Total		Count	111	363	474
		% within week	23.4%	76.6%	100.0%

On the 1st week 60.8%, 19th 17.1% and 36th 17.1% reported that they were too tired to do physical activity. On the other hand on the 1st week 39.2%, 82.9% on the 19th week and 82.9% on the 36th week reported that being tired was not a factor for them.

3. week * I'm too tired

			I'm too tired		
			Yes	No	Total
week	1st	Count	96	62	158
		% within week	60.8%	39.2%	100.0%
	19th	Count	27	131	158
		% within week	17.1%	82.9%	100.0%
	36th	Count	27	131	158
		% within week	17.1%	82.9%	100.0%
Total		Count	150	324	474
		% within week	31.6%	68.4%	100.0%

On the 1st week 18.4%, 19th 0.6% and 36th 0.6% reported that they lacked discipline to do physical activity. On the other hand on the 1st week 81.6%, 99.4% on the 19th week and 99.4% on the 36th week reported that being disciplined was not a factor for them.

4. week * Lack of discipline

			Lack of discipline		
			Yes	No	Total
week	1st	Count	29	129	158
		% within week	18.4%	81.6%	100.0%
	19th	Count	1	157	158
		% within week	0.6%	99.4%	100.0%
	36th	Count	1	157	158
		% within week	0.6%	99.4%	100.0%
Total		Count	31	443	474
		% within week	6.5%	93.5%	100.0%

On the 1st week 18.4%, 19th 0.6% and 36th 0.6% reported that the physical activity is too hard for them. On the other hand on the 1st week 81.6%, 99.4% on the 19th week and 99.4% on the 36th week reported that physical activity hardness was not a factor for them.

5. week * Too hard ... there's got to be an easier way!

			Too hard ... there's got to be an easier way!		
			Yes	No	Total
week	1st	Count	29	129	158
		% within week	18.4%	81.6%	100.0%
	19th	Count	1	157	158
		% within week	0.6%	99.4%	100.0%
	36th	Count	1	157	158
		% within week	0.6%	99.4%	100.0%
Total		Count	31	443	474

5. week * Too hard ... there's got to be an easier way!

			Too hard ... there's got to be an easier way!		
			Yes	No	Total
week	1st	Count	29	129	158
		% within week	18.4%	81.6%	100.0%
	19th	Count	1	157	158
		% within week	0.6%	99.4%	100.0%
	36th	Count	1	157	158
		% within week	0.6%	99.4%	100.0%
Total		Count	31	443	474
		% within week	6.5%	93.5%	100.0%

On the 1st week 6.3%, 19th 0.6% and 36th 0.6% reported that physical activity is discouraging. On the other hand on the 1st week 93.7%, 99.4% on the 19th week and 99.4% on the 36th week reported that physical activity was not a discouraging factor for them.

6. week * Discouraging

			Discouraging		
			Yes	No	Total
Week	1st	Count	10	148	158
		% within week	6.3%	93.7%	100.0%
	19th	Count	1	157	158
		% within week	0.6%	99.4%	100.0%
	36th	Count	1	157	158
		% within week	0.6%	99.4%	100.0%
Total		Count	12	462	474
		% within week	2.5%	97.5%	100.0%

On the 1st week 12%, 19th 0% and 36th 0% reported that physical activity is not enjoyable. On the other hand on the 1st week 88%, 100% on the 19th week and 100% on the 36th week reported that physical activity being enjoyable was not a factor for them.

7. week * Not enjoyable

			Not enjoyable		
			Yes	No	Total
Week	1st	Count	19	139	158
		% within week	12.0%	88.0%	100.0%
	19th	Count	0	158	158
		% within week	0%	100.0%	100.0%
	36th	Count	0	158	158
		% within week	0%	100.0%	100.0%
Total		Count	19	455	474
		% within week	4.0%	96.0%	100.0%

On the 1st week 6.3%, 19th 0.6% and 36th 0.6% reported that they had bad experience with delayed onset of muscle soreness from physical activity. On the other hand on the 1st week 93.7%, 99.4% on the 19th week and 99.4% on the 36th week reported that delayed onset of muscle soreness from physical activity was not a factor for them.

8. week * Bad experience with Delayed Onset of Muscle Soreness

			Bad experience with Delayed Onset of Muscle Soreness		
			Yes	No	Total
Week	1st	Count	10	148	158
		% within week	6.3%	93.7%	100.0%
	19th	Count	1	157	158
		% within week	.6%	99.4%	100.0%
	36th	Count	1	157	158
		% within week	.6%	99.4%	100.0%
Total		Count	12	462	474
		% within week	2.5%	97.5%	100.0%

On the 1st week 12%, 19th 0% and 36th 0% reported that the expense of equipment, clothes and membership was a factor for them. On the other hand on the 1st week 88%, 100% on the 19th week and 100% on the 36th week reported that expense of equipment, clothes and membership for physical activity was not a factor for them.

9 week * Expense of equipment, clothes, membership

			Expense of equipment, clothes, membership		
			Yes	No	Total
Week	1st	Count	19	139	158
		% within week	12.0%	88.0%	100.0%
	19th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
	36th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
Total		Count	19	455	474
		% within week	4.0%	96.0%	100.0%

On the 1st week 100%, 19th 100% and 36th 100% reported that distance walked was not a factor for physical activity.

10.week * Distance				
			Distance	
			No	Total
Week	1st	Count	158	158
		% within week	100.0%	100.0%
	19th	Count	158	158
		% within week	100.0%	100.0%
	36th	Count	158	158
		% within week	100.0%	100.0%
Total		Count	474	474
		% within week	100.0%	100.0%

On the 1st week 24.7%, 19th 0% and 36th 0% reported that inconvenience was a factor for physical activity. On the other hand on the 1st week 75.3%, 100% on the 19th week and 100% on the 36th week reported that inconvenience was not a factor for physical activity.

11.week * Inconvenience					
			Inconvenience		
			Yes	No	Total
Week	1st	Count	39	119	158
		% within week	24.7%	75.3%	100.0%
	19th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
	36th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
Total		Count	39	435	474
		% within week	8.2%	91.8%	100.0%

On the 1st week 24.7%, 19th 0% and 36th 0% reported that boredom was a factor for physical activity. On the other hand on the 1st week 75.3%, 100% on the 19th week and 100% on the 36th week reported that boredom was not a factor for physical activity.

12. week * Boredom

			Boredom		
			Yes	No	Total
Week	1st	Count	39	119	158
		% within week	24.7%	75.3%	100.0%
	19th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
	36th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
Total		Count	39	435	474
		% within week	8.2%	91.8%	100.0%

On the 1st week 12.7%, 19th 0% and 36th 0% reported that lack of variety was a factor for physical activity. On the other hand on the 1st week 87.3%, 100% on the 19th week and 100% on the 36th week reported that lack of variety was not a factor for physical activity.

13.week * Lack of variety					
			Lack of variety		
			Yes	No	Total
Week	1st	Count	20	138	158
		% within week	12.7%	87.3%	100.0%
	19th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
	36th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
Total		Count	20	454	474
		% within week	4.2%	95.8%	100.0%

On the 1st week 31%, 19th 33.5% and 36th 33.5% reported that injury/health problems was a factor for physical activity. On the other hand on the 1st week 69%, 66.5% on the 19th week and 66.5% on the 36th week reported that injury/health problems was not a factor for physical activity.

14. week * Injury/health problems					
			Injury/health problems		
			Yes	No	Total
Week	1st	Count	49	109	158
		% within week	31.0%	69.0%	100.0%
	19th	Count	53	105	158
		% within week	33.5%	66.5%	100.0%
	36th	Count	53	105	158
		% within week	33.5%	66.5%	100.0%
Total		Count	155	319	474
		% within week	32.7%	67.3%	100.0%

On the 1st week 55.7%, 19th 49.4% and 36th 49.4% reported that chronic physical discomfort was a factor for physical activity. On the other hand on the 1st week 44.3%, 50.6% on the 19th week and 50.6% on the 36th week reported that chronic physical discomfort was not a factor for physical activity.

15. week * Chronic Physical Discomfort

			Chronic Physical Discomfort		
			Yes	No	Total
week	1st	Count	88	70	158
		% within week	55.7%	44.3%	100.0%
	19th	Count	78	80	158
		% within week	49.4%	50.6%	100.0%
	36th	Count	78	80	158
		% within week	49.4%	50.6%	100.0%
Total		Count	244	230	474
		% within week	51.5%	48.5%	100.0%

On the 1st week 55.7%, 19th 32.9% and 36th 32.9% reported that embarrassment was a factor for physical activity. On the other hand on the 1st week 44.3%, 67.1% on the 19th week and 67.1% on the 36th week reported that embarrassment was not a factor for physical activity.

16. week * Embarrassment					
			Embarrassment		
			Yes	No	Total
week	1st	Count	88	70	158
		% within week	55.7%	44.3%	100.0%
	19th	Count	52	106	158
		% within week	32.9%	67.1%	100.0%
	36th	Count	52	106	158
		% within week	32.9%	67.1%	100.0%
Total		Count	192	282	474
		% within week	40.5%	59.5%	100.0%

On the 1st week 51.3%, 19th 17.1% and 36th 17.1% reported that social discomfort was a factor for physical activity. On the other hand on the 1st week 48.7%, 82.9% on the 19th week and 82.9% on the 36th week reported that social discomfort was not a factor for physical activity.

17. week * Social Discomfort					
			Social Discomfort		
			Yes	No	Total
week	1st	Count	81	77	158
		% within week	51.3%	48.7%	100.0%
	19th	Count	27	131	158
		% within week	17.1%	82.9%	100.0%
	36th	Count	27	131	158
		% within week	17.1%	82.9%	100.0%
Total		Count	135	339	474
		% within week	28.5%	71.5%	100.0%

On the 1st week 38.6%, 19th 17.7% and 36th 17.7% reported that lack of understanding of the benefits was a factor for physical activity. On the other hand on the 1st week 61.4%, 82.3% on the 19th week and 82.3% on the 36th week reported that lack of understanding of the benefits was not a factor for physical activity.

18. week * Lack of understanding of the benefits

			Lack of understanding of the benefits		
			Yes	No	Total
week	1st	Count	61	97	158
		% within week	38.6%	61.4%	100.0%
	19th	Count	28	130	158
		% within week	17.7%	82.3%	100.0%
	36th	Count	28	130	158
		% within week	17.7%	82.3%	100.0%
Total		Count	117	357	474
		% within week	24.7%	75.3%	100.0%

On the 1st week 25.9%, 19th 0.6% and 36th 0.6% reported that low priority was a factor for physical activity. On the other hand on the 1st week 74.1%, 99.4% on the 19th week and 99.4% on the 36th week reported that low priority was not a factor for physical activity.

19. week * Low priority

			Low priority		
			Yes	No	Total
week	1st	Count	41	117	158
		% within week	25.9%	74.1%	100.0%
	19th	Count	1	157	158
		% within week	0.6%	99.4%	100.0%
	36th	Count	1	157	158
		% within week	0.6%	99.4%	100.0%
Total		Count	43	431	474
		% within week	9.1%	90.9%	100.0%

On the 1st week 36.7%, 19th 0% and 36th 0% reported that apathy was a factor for physical activity. On the other hand on the 1st week 63.3%, 100% on the 19th week and 100% on the 36th week reported that apathy was not a factor for physical activity.

20. week * Apathy

			Apathy		
			Yes	No	Total
week	1st	Count	58	100	158
		% within week	36.7%	63.3%	100.0%
	19th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
	36th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
Total		Count	58	416	474
		% within week	12.2%	87.8%	100.0%

On the 1st week 24.1%, 19th 0% and 36th 0% reported that they didn't care for physical activity. On the other hand on the 1st week 75.9%, 100% on the 19th week and 100% on the 36th week reported that "I don't care to exercise" was a factor for physical activity.

21. week * Don't care to

			Don't care to		
			Yes	No	Total
week	1st	Count	38	120	158
		% within week	24.1%	75.9%	100.0%
	19th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
	36th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
Total		Count	38	436	474
		% within week	8.0%	92.0%	100.0%

On the 1st week 24.7%, 19th 0% and 36th 0% reported that weather conditions was a factor for physical activity. On the other hand on the 1st week 75.3%, 100% on the 19th week and 100% on the 36th week reported that weather conditions was not a factor for physical activity.

22. week * Weather conditions

			Weather conditions		
			Yes	No	Total
week	1st	Count	39	119	158
		% within week	24.7%	75.3%	100.0%
	19th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
	36th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
Total		Count	39	435	474

22. week * Weather conditions					
			Weather conditions		
			Yes	No	Total
week	1st	Count	39	119	158
		% within week	24.7%	75.3%	100.0%
	19th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
	36th	Count	0	158	158
		% within week	.0%	100.0%	100.0%
Total		Count	39	435	474
		% within week	8.2%	91.8%	100.0%

BY GENDER

The intervention group reported for male - female on the 1st week 76% - 75.9, 19th 82.7% - 85.5% and 36th 82.7% - 85.5 respectively that they had no time in their busy schedule to do physical activity. On the other hand for male – female on the 1st week 24.1% - 24.1%, 15.8% - 14.5% on the 19th week and 18.6% - 14.5% on the 36th week respectively, reported that time was not a factor for them.

1. week * No time in my busy schedule * by gender

				No time in my busy schedule		
Sex				Yes	No	Total
Male	week	1st	Count	57	18	75
			% within week	76.0%	24.0%	100.0%
		19th	Count	62	13	75
			% within week	82.7%	17.3%	100.0%
		36th	Count	62	13	75
			% within week	82.7%	17.3%	100.0%
	Total		Count	181	44	225
			% within week	80.4%	19.6%	100.0%
Female	week	1st	Count	63	20	83
			% within week	75.9%	24.1%	100.0%
		19th	Count	71	12	83
			% within week	85.5%	14.5%	100.0%
		36th	Count	71	12	83
			% within week	85.5%	14.5%	100.0%
	Total		Count	205	44	249
			% within week	82.3%	17.7%	100.0%

The intervention group reported for male – female on the 1st week 64% - 62.7, 19th 8% and 36th 0% - 0% respectively that they had no energy to do physical activity. On the other hand on for male – female the 1st week 36% - 37.3%, 92% - 94% on the 19th week and 100% - 100% respectively on the 36th week reported that energy was not a factor for them.

2. week * No energy * by gender						
				No energy		
Sex				Yes	No	Total
Male	week	1st	Count	48	27	75
			% within week	64.0%	36.0%	100.0%
		19th	Count	6	69	75
			% within week	8.0%	92.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	54	171	225
			% within week	24.0%	76.0%	100.0%
female	week	1st	Count	52	31	83
			% within week	62.7%	37.3%	100.0%
		19th	Count	5	78	83
			% within week	6.0%	94.0%	100.0%
		36th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
	Total		Count	57	192	249

The intervention group reported for male – female on the 1st week 64% - 57.8%, 19th 16% - 18.1% and 36th 16% - 18.1% respectively that they were too tired to do physical activity. On the other hand for male – female on the 1st week 36%, 36%- 42.2% on the 19th week and 84% - 81.9% - on the 36th week respectively reported that being tired was not a factor for them.

3. week * I'm too tired * by gender

				I'm too tired		
Sex				Yes	No	Total
Male	week	1st	Count	48	27	75
			% within week	64.0%	36.0%	100.0%
		19th	Count	12	63	75
			% within week	16.0%	84.0%	100.0%
		36th	Count	12	63	75
			% within week	16.0%	84.0%	100.0%
	Total		Count	72	153	225
			% within week	32.0%	68.0%	100.0%
Female	week	1st	Count	48	35	83
			% within week	57.8%	42.2%	100.0%
		19th	Count	15	68	83
			% within week	18.1%	81.9%	100.0%
		36th	Count	15	68	83
			% within week	18.1%	81.9%	100.0%
	Total		Count	78	171	249
			% within week	31.3%	68.7%	100.0%

The intervention group reported for male – female on the 1st week 20% - 16.9%, 19th 0% - 1.2% and 36th 0% - 1.2% respectively that they lacked discipline to do physical activity. On the other hand on for male – female the 1st week 80% - 83.1%, 100% - 98.8% on the 19th week and 100% - 98.8 on the 36th week respectively reported that being disciplined was not a factor for them.

4. week * Lack of discipline * by gender						
				Lack of discipline		
Sex				Yes	No	Total
Male	week	1st	Count	15	60	75
			% within week	20.0%	80.0%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	15	210	225
			% within week	6.7%	93.3%	100.0%
Female	week	1st	Count	14	69	83
			% within week	16.9%	83.1%	100.0%
		19th	Count	1	82	83
			% within week	1.2%	98.8%	100.0%
		36th	Count	1	82	83
			% within week	1.2%	98.8%	100.0%
	Total		Count	16	233	249
			% within week	6.4%	93.6%	100.0%

The intervention group reported for male – female on the 1st week 20% - 16.9%, 19th 0% - 1.2% and 36th 0% - 1.2% respectively that physical activity is too hard for them. On the other hand for male – female on the 1st week 80% - 83.1%, 100% - 98.8% on the 19th week and 100% - 98.8% on the 36th week respectively reported that physical activity hardness was not a factor for them.

5. week * Too hard ... there's got to be an easier way! * by gender						
				Too hard ... there's got to be an easier way!		
Sex				Yes	No	Total
Male	week	1st	Count	15	60	75
			% within week	20.0%	80.0%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	15	210	225
			% within week	6.7%	93.3%	100.0%
Female	week	1st	Count	14	69	83
			% within week	16.9%	83.1%	100.0%
		19th	Count	1	82	83
			% within week	1.2%	98.8%	100.0%
		36th	Count	1	82	83
			% within week	1.2%	98.8%	100.0%
	Total		Count	16	233	249
			% within week	6.4%	93.6%	100.0%

The intervention group reported for male – female on the 1st week 6.7% - 6%, 19th 0% - 1.2% and 36th 0% - 1.2% respectively that physical activity is discouraging. On the other hand for male – female on the 1st week 93.3% - 94%, 100% - 98.8% on the 19th week and 100% - 98.8% on the 36th week respectively reported that physical activity was not discouraging factor for them.

6. week * Discouraging * by gender						
				Discouraging		
Sex				Yes	No	Total
Male	week	1st	Count	5	70	75
			% within week	6.7%	93.3%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	5	220	225
			% within week	2.2%	97.8%	100.0%
Female	week	1st	Count	5	78	83
			% within week	6.0%	94.0%	100.0%
		19th	Count	1	82	83
			% within week	1.2%	98.8%	100.0%
		36th	Count	1	82	83
			% within week	1.2%	98.8%	100.0%
	Total		Count	7	242	249
			% within week	2.8%	97.2%	100.0%

The intervention group reported for male – female on the 1st week 13.3% - 10.8%, 19th 0% - 0% and 36th 0% - 0% respectively that physical activity is not enjoyable. On the other hand for male – female on the 1st week 86.7% - 89.2%, 100% - 100% on the 19th week and 100% - 100% respectively on the 36th week reported that physical activity being enjoyable was not a factor for them.

7. week * Not enjoyable * by gender						
				Not enjoyable		
Sex				Yes	No	Total
Male	week	1st	Count	10	65	75
			% within week	13.3%	86.7%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	10	215	225
			% within week	4.4%	95.6%	100.0%
Female	week	1st	Count	9	74	83
			% within week	10.8%	89.2%	100.0%
		19th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
		36th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
	Total		Count	9	240	249
			% within week	3.6%	96.4%	100.0%

The intervention group reported for male – female on the 1st week 6.7% - 6.0%, 19th 0% - 1.2% and 36th 0% - 1.2% respectively that they had bad experience with delayed onset of muscle soreness from physical activity. On the other hand for male – female on the 1st week 93.3% - 94, 100% - 98.8% on the 19th week and 97.8% - 98.8% respectively on the 36th week reported that delayed onset of muscle soreness from physical activity was not a factor for them.

8. week * Bad experience with Delayed Onset of Muscle Soreness * by gender

				Bad experience with Delayed Onset of Muscle Soreness		
Sex				Yes	No	Total
Male	week	1st	Count	5	70	75
			% within week	6.7%	93.3%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	5	220	225
			% within week	2.2%	97.8%	100.0%
Female	week	1st	Count	5	78	83
			% within week	6.0%	94.0%	100.0%
		19th	Count	1	82	83
			% within week	1.2%	98.8%	100.0%
		36th	Count	1	82	83
			% within week	1.2%	98.8%	100.0%
	Total		Count	7	242	249
			% within week	2.8%	97.2%	100.0%

The intervention group reported for male – female on the 1st week 12%, 19th 0% and 36th 0% that the expense of equipment, clothes and membership was a factor for them. On the other hand for male – female on the 1st week 88%, 100% on the 19th week and 100% on the 36th week reported that expense of equipment, clothes and membership for physical activity was not a factor for them.

9. Week * Expense of equipment, clothes, membership * by gender

Sex				Expense of equipment, clothes, membership: Yes	No	Total
Male	week	1st	Count	9	66	75
			% within week	12.0%	88.0%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	9	216	225
			% within week	4.0%	96.0%	100.0%
Female	week	1st	Count	10	73	83
			% within week	12.0%	88.0%	100.0%
		19th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
		36th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
	Total		Count	10	239	249
			% within week	4.0%	96.0%	100.0%

The intervention group reported for male and female on the 1st week 100%, 19th 100% and 36th 100% that distance was not a factor for physical activity.

10. Week * Distance * by gender					
				Distance	
Sex				No	Total
Male	week	1st	Count	75	75
			% within week	100.0%	100.0%
		19th	Count	75	75
			% within week	100.0%	100.0%
		36th	Count	75	75
			% within week	100.0%	100.0%
	Total		Count	225	225
			% within week	100.0%	100.0%
Female	week	1st	Count	83	83
			% within week	100.0%	100.0%
		19th	Count	83	83
			% within week	100.0%	100.0%
		36th	Count	83	83
			% within week	100.0%	100.0%
	Total		Count	249	249
			% within week	100.0%	100.0%

The intervention group reported for male – female on the 1st week the 24% - 25.3%, 19th 0% - 0% and 36th 0% - 0% respectively that inconvenience was a factor for physical activity. On the other hand for male – female on the 1st week 76% - 74.7%, 100% - 100% on the 19th week and 100% - 100% respectively on the 36th week reported that inconvenience was not a factor for physical activity.

11. week * Inconvenience * by gender						
				Inconvenience		
Sex				Yes	No	Total
Male	week	1st	Count	18	57	75
			% within week	24.0%	76.0%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	18	207	225
			% within week	8.0%	92.0%	100.0%
Female	week	1st	Count	21	62	83
			% within week	25.3%	74.7%	100.0%
		19th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
		36th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
	Total		Count	21	228	249
			% within week	8.4%	91.6%	100.0%

The intervention group reported for male – female on the 1st week 25.3% - 24.1%, 19th 0% - 0% and 36th 0% - 0% respectively that boredom was factor for physical activity. On the other hand for male – female on the 1st week 74.7% - 75.9%, 100% - 100% on the 19th week and 100% - 100% respectively on the 36th week reported that boredom was not a factor for physical activity.

12. week * Boredom * by gender						
				Boredom		
Sex				Yes	No	Total
Male	week	1st	Count	19	56	75
			% within week	25.3%	74.7%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	19	206	225
			% within week	8.4%	91.6%	100.0%
Female	week	1st	Count	20	63	83
			% within week	24.1%	75.9%	100.0%
		19th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
		36th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
	Total		Count	20	229	249
			% within week	8.0%	92.0%	100.0%

The intervention group reported for male – female on the 1st week 12% - 13.3%, 19th 0% - 0% and 36th 0% - 0% respectively that lack of variety was a factor for physical activity. On the other hand on the 1st week 88% - 86.7, 100% - 100% on the 19th week and 100% - 100% on the 36th week respectively reported that lack of variety was not a factor for physical activity.

13. week * Lack of variety * by gender						
				Lack of variety		
Sex				Yes	No	Total
Male	week	1st	Count	9	66	75
			% within week	12.0%	88.0%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	9	216	225
			% within week	4.0%	96.0%	100.0%
female	week	1st	Count	11	72	83
			% within week	13.3%	86.7%	100.0%
		19th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
		36th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
	Total		Count	11	238	249
			% within week	4.4%	95.6%	100.0%

The intervention group reported for male – female on the 1st week 30.7% - 31.3%, 19th 33.3%- 33.7% and 36th 33.3% - 33.7% respectively that injury/health problem was a factor for physical activity. On the other hand for male – female on the 1st week 69.3% - 68.7%, 66.7% - 66.3%on the 19th week and 66.7% - 66.3% respectively on the 36th week reported that injury/health problems was not a factor for physical activity.

14. week * Injury/health problems * by gender						
				Injury/health problems		
Sex				Yes	No	Total
Male	week	1st	Count	23	52	75
			% within week	30.7%	69.3%	100.0%
		19th	Count	25	50	75
			% within week	33.3%	66.7%	100.0%
		36th	Count	25	50	75
			% within week	33.3%	66.7%	100.0%
	Total		Count	73	152	225
			% within week	32.4%	67.6%	100.0%
Female	week	1st	Count	26	57	83
			% within week	31.3%	68.7%	100.0%
		19th	Count	28	55	83
			% within week	33.7%	66.3%	100.0%
		36th	Count	28	55	83
			% within week	33.7%	66.3%	100.0%
	Total		Count	82	167	249
			% within week	32.9%	67.1%	100.0%

The intervention group reported for male – female on the 1st week 56% - 55.4%, 19th 49.3%- 49.4% and 36th 49.3% - 49.4% respectively that chronic physical discomfort was a factor for physical activity. On the other hand for male – female on the 1st week 44% - 44.6%, 50.7%- 50.6% on the 19th week and 50.7% - 50.6% respectively on the 36th week reported that chronic physical discomfort was not a factor for physical activity.

15. week * Chronic Physical Discomfort * by gender						
				Chronic Physical Discomfort		
Sex				Yes	No	Total
Male	week	1st	Count	42	33	75
			% within week	56.0%	44.0%	100.0%
		19th	Count	37	38	75
			% within week	49.3%	50.7%	100.0%
		36th	Count	37	38	75
			% within week	49.3%	50.7%	100.0%
	Total		Count	116	109	225
			% within week	51.6%	48.4%	100.0%
Female	week	1st	Count	46	37	83
			% within week	55.4%	44.6%	100.0%
		19th	Count	41	42	83
			% within week	49.4%	50.6%	100.0%
		36th	Count	41	42	83
			% within week	49.4%	50.6%	100.0%
	Total		Count	128	121	249
			% within week	51.4%	48.6%	100.0%

The intervention group reported for male – female on the 1st week 56% - 55.4%, 19th 33.3% - 32.5% % and 36th 33.3 % - 32.5% respectively that embarrassment was a factor for physical activity. On the other hand for male – female on the 1st week 44% - 44.6%, 66.7% - 67.5% on the 19th week and 66.7% - 67.5% respectively on the 36th week reported that embarrassment was not a factor for physical activity.

16. week * Embarrassment * by gender						
				Embarrassment		
Sex				Yes	No	Total
male	week	1st	Count	42	33	75
			% within week	56.0%	44.0%	100.0%
		19th	Count	25	50	75
			% within week	33.3%	66.7%	100.0%
		36th	Count	25	50	75
			% within week	33.3%	66.7%	100.0%
	Total		Count	92	133	225
			% within week	40.9%	59.1%	100.0%
female	week	1st	Count	46	37	83
			% within week	55.4%	44.6%	100.0%
		19th	Count	27	56	83
			% within week	32.5%	67.5%	100.0%
		36th	Count	27	56	83
			% within week	32.5%	67.5%	100.0%
	Total		Count	100	149	249
			% within week	40.2%	59.8%	100.0%

The intervention group reported for male – female on the 1st week 49.3%- 53%, 19th 17.3%- 16.9% and 36th 17.3% - 16.9% respectively that social discomfort was a factor for physical activity. On the other hand for male – female on the 1st week 50.7% - 47%, 82.7% - 83.1% on the 19th week and 82.7%- 83.1% respectively on the 36th week reported that social discomfort was not a factor for physical activity.

17. week * Social Discomfort * by gender						
				Social Discomfort		
Sex				Yes	No	Total
male	Week	1st	Count	37	38	75
			% within week	49.3%	50.7%	100.0%
		19th	Count	13	62	75
			% within week	17.3%	82.7%	100.0%
		36th	Count	13	62	75
			% within week	17.3%	82.7%	100.0%
	Total		Count	63	162	225
			% within week	28.0%	72.0%	100.0%
female	Week	1st	Count	44	39	83
			% within week	53.0%	47.0%	100.0%
		19th	Count	14	69	83
			% within week	16.9%	83.1%	100.0%
		36th	Count	14	69	83
			% within week	16.9%	83.1%	100.0%
	Total		Count	72	177	249
			% within week	28.9%	71.1%	100.0%

The intervention group reported for male – female on the 1st week 37.3% - 39.8%, 19th 17.3% - 18.1% and 36th 17.3% - 18.1% respectively that lack of understanding of the benefits was a factor for physical activity. On the other hand for male – female on the 1st week 62.7% - 60.2%, 82.7% - 81.9% on the 19th week and 82.7% - 81.9% respectively on the 36th week reported that lack of understanding of the benefits was not a factor for physical activity.

18. week * Lack of understanding of the benefits * by gender						
				Lack of understanding of the benefits		
Sex				Yes	No	Total
male	week	1st	Count	28	47	75
			% within week	37.3%	62.7%	100.0%
		19th	Count	13	62	75
			% within week	17.3%	82.7%	100.0%
		36th	Count	13	62	75
			% within week	17.3%	82.7%	100.0%
	Total		Count	54	171	225
			% within week	24.0%	76.0%	100.0%
female	week	1st	Count	33	50	83
			% within week	39.8%	60.2%	100.0%
		19th	Count	15	68	83
			% within week	18.1%	81.9%	100.0%
		36th	Count	15	68	83
			% within week	18.1%	81.9%	100.0%
	Total		Count	63	186	249
			% within week	25.3%	74.7%	100.0%

The intervention group reported for male – female on the 1st week 25.3% - 26.5%, 19th 0% - 1.2% and 36th 0% - 1.2% respectively that low priority was a factor for physical activity. On the other hand for male – female on the 1st week 74.7%-73.5%, The intervention group reported for male – female on the 1st week the 38.7% - 34.9%, 19th 0%-0% and 36th 0%-0% respectively that apathy was a factor for physical activity. On the other hand for male – female on the 1st week 61.3% - 65.1%, 100% - 10% on the 19th week and 100% - 100% respectively on the 36th week reported that apathy was not a factor for physical activity.

week * Low priority * by gender						
				Low priority		
Sex				Yes	No	Total
Male	week	1st	Count	19	56	75
			% within week	25.3%	74.7%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	19	206	225
			% within week	8.4%	91.6%	100.0%
Female	week	1st	Count	22	61	83
			% within week	26.5%	73.5%	100.0%
		19th	Count	1	82	83
			% within week	1.2%	98.8%	100.0%
		36th	Count	1	82	83
			% within week	1.2%	98.8%	100.0%
	Total		Count	24	225	249
			% within week	9.6%	90.4%	100.0%

The intervention group reported for male – female on the 1st week 26.7% - 21.7%, 19th 0%- 0% and 36th 0%- 0% respectively that they didn't care for physical activity. On the other hand for male – female on the 1st week 73.3% - 78.3%, 100% - 100% on the 19th week and 100% - 100% respectively on the 36th week reported that "I don't care to exercise" was a factor for physical activity.

19. week * Don't care to * by gender

				Don't care to		
Sex				Yes	No	Total
Male	week	1st	Count	20	55	75
			% within week	26.7%	73.3%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	20	205	225
			% within week	8.9%	91.1%	100.0%
Female	week	1st	Count	18	65	83
			% within week	21.7%	78.3%	100.0%
		19th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
		36th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
	Total		Count	18	231	249
			% within week	7.2%	92.8%	100.0%

The intervention group reported for male – female on the 1st week the 38.7% - 34.9%, 19th 0%-0% and 36th 0%-0% respectively that apathy was a factor for physical activity. On the other hand for male – female on the 1st week 61.3% - 65.1%, 100% - 10% on the 19th week and 100% - 100% respectively on the 36th week reported that apathy was not a factor for physical activity.

20. week * Apathy * by gender

Sex				Apathy Yes	No	Total
Male	week	1st	Count	29	46	75
			% within week	38.7%	61.3%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	29	196	225
			% within week	12.9%	87.1%	100.0%
Female	week	1st	Count	29	54	83
			% within week	34.9%	65.1%	100.0%
		19th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
		36th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
	Total		Count	29	220	249
			% within week	11.6%	88.4%	100.0%

The intervention group reported for male – female on the 1st week 25.3% - 24.1%, 19th 0% - 0% and 36th 0% - 0% respectively that weather conditions was a factor for physical activity. On the other hand for male – female on the 1st week 74.7% - 75.9%, 100% - 100% on the 19th week and 100% - 100% respectively on the 36th week reported that weather conditions was not a factor for physical activity.

week * Weather conditions * by gender						
				Weather conditions		
Sex				Yes	No	Total
Male	week	1st	Count	19	56	75
			% within week	25.3%	74.7%	100.0%
		19th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
		36th	Count	0	75	75
			% within week	.0%	100.0%	100.0%
	Total		Count	19	206	225
			% within week	8.4%	91.6%	100.0%
Female	week	1st	Count	20	63	83
			% within week	24.1%	75.9%	100.0%
		19th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
		36th	Count	0	83	83
			% within week	.0%	100.0%	100.0%
	Total		Count	20	229	249
			% within week	8.0%	92.0%	100.0%

Barriers influenced by exercise the most.

Table 41. **What influences physical activity (sort by week 1)**

YES	WEEK (%)		
	1	19	36
No time in my busy schedule	75.9	84.2	84.2
No energy	63.3	7.0	0.0
I am too tired	60.8	17.1	17.1
Chronic physical discomfort	55.7	49.4	49.4
Embarrassment	55.7	32.9	32.9
Social discomfort	51.3	17.1	17.1
Lack of understanding of the benefits	38.6	17.7	17.7
Apathy	36.7	0.0	0.0
Injury/heath problems	31.0	33.5	33.5
Low priority	25.9	0.6	0.6
Inconvenience	24.7	0.0	0.0
Boredom	24.7	0.0	0.0
Weather conditions	24.7	0.0	0.0
Don't care to	24.7	0.0	0.0
Lack of discipline	18.4	0.6	0.6
Too hard … there's got to be an easier way!	18.4	0.6	0.6
Lack of variety	12.7	0.0	0.0
Not enjoyable	12.0	0.0	0.0
Expense of equipment, clothes, membership	12.0	0.0	0.0
Discouraging	6.3	0.6	0.6
Bad experience with DOMS	6.3	0.6	0.6
Distance	0.0	0.0	0.0

Table 42. **What influences physical activity (sort by week 19)**

YES	WEEK (%)		
	1	19	36
No time in my busy schedule	75.9	84.2	84.2
Chronic physical discomfort	55.7	49.4	49.4
Injury/heath problems	31.0	33.5	33.5
Embarrassment	55.7	32.9	32.9
Lack of understanding of the benefits	38.6	17.7	17.7
I am too tired	60.8	17.1	17.1
Social discomfort	51.3	17.1	17.1
No energy	63.3	7.0	0.0
Low priority	25.9	0.6	0.6
Lack of discipline	18.4	0.6	0.6
Too hard … there's got to be an easier way!	18.4	0.6	0.6
Discouraging	6.3	0.6	0.6
Bad experience with DOMS	6.3	0.6	0.6
Apathy	36.7	0.0	0.0
Inconvenience	24.7	0.0	0.0
Boredom	24.7	0.0	0.0
Weather conditions	24.7	0.0	0.0
Don't care to	24.7	0.0	0.0
Lack of variety	12.7	0.0	0.0
Not enjoyable	12.0	0.0	0.0
Expense of equipment, clothes, membership	12.0	0.0	0.0
Distance	0.0	0.0	0.0

Table 43. **What influences physical activity (sort by week 36)**

YES	WEEK (%)		
	1	19	36
No time in my busy schedule	75.9	84.2	84.2
Chronic physical discomfort	55.7	49.4	49.4
Injury/heath problems	31.0	33.5	33.5
Embarrassment	55.7	32.9	32.9
Lack of understanding of the benefits	38.6	17.7	17.7
I am too tired	60.8	17.1	17.1
Social discomfort	51.3	17.1	17.1
Low priority	25.9	0.6	0.6
Lack of discipline	18.4	0.6	0.6
Too hard … there's got to be an easier way!	18.4	0.6	0.6
Discouraging	6.3	0.6	0.6
Bad experience with DOMS	6.3	0.6	0.6
No energy	63.3	7.0	0.0
Apathy	36.7	0.0	0.0
Inconvenience	24.7	0.0	0.0
Boredom	24.7	0.0	0.0
Weather conditions	24.7	0.0	0.0
Don't care to	24.1	0.0	0.0
Lack of variety	12.7	0.0	0.0
Not enjoyable	12.0	0.0	0.0
Expense of equipment, clothes, membership	12.0	0.0	0.0
Distance	0.0	0.0	0.0

According to Checklist D for the first week subjects reported that as the first three factors that influence them not to do physical activity were initially <no time in my busy schedule> 75.9% , second <no energy> 63.3% and third <I am too tired> 6.8%. For the 19th week they reported <no time in my busy schedule> 84.2%, <chronic physical discomfort> 49.4% and <injury/health problems> 33.5%. For the 36th week the subjects reported <no time in my busy schedule> 84.2%, <chronic physical discomfort> 49.4% and <injury/health problems> 33.5%.

Scoring for checklist D

Checklist D is based on a likert scale based questions (<3 YES =not bad, 4-5 YES =poor motivation 6-8 YES = very poor motivation and 9-11 YES = Get help).

The scoring for men in the checklist D - What influences physical activity shows that in the 1st week 38% needed to get help for behavioural modification for exercise, whereas in weeks 19th and 36th nobody needed help. For female 33% needed to get help for behavioural modification for exercise for the 1st week and nobody for weeks 19th and 36th. Furthermore 19,7% of men reported having very poor motivation in the 1st week and nobody reported poor motivation for weeks 19th and 36th.. Women had 19,1% poor motivation for the first week and nobody reported poor motivation for weeks 19th and 36th. Poor motivation was reported as 19,7% for men and 21,6% for women the 1st week. Nobody reported poor motivation the 19th and the 36th week for poor motivation

The Pearson correlation (r) shows that there is negative correlation between the section scores and the weeks. This explains that when weeks pass by, the answers tend to move to <not bad> levels, instead of <get help> level. The shift to the <not bad> levels shows a positive change of the participants behaviour.

week * score * sex

Sex				Score				
				2.00	3.00	4.00	5.00	6.00
Male	week	1st	Count	0	20	9	5	5
			% within week	.0%	26.7%	12.0%	6.7%	6.7%
		19th	Count	14	57	4	0	0
			% within week	18.7%	76.0%	5.3%	.0%	.0%
		36th	Count	14	61	0	0	0
			% within week	18.7%	81.3%	.0%	.0%	.0%
	Total		Count	28	138	13	5	5
			% within week	12.4%	61.3%	5.8%	2.2%	2.2%
Female	week	1st	Count	0	22	10	8	3
			% within week	.0%	26.5%	12.0%	9.6%	3.6%
		19th	Count	12	65	5	1	0
			% within week	14.5%	78.3%	6.0%	1.2%	.0%
		36th	Count	12	70	0	1	0
			% within week	14.5%	84.3%	.0%	1.2%	.0%
	Total		Count	24	157	15	10	3
			% within week	9.6%	63.1%	6.0%	4.0%	1.2%

week * score * sex

Sex				Score				
				7.00	8.00	9.00	10.00	11.00
Male	week	1st	Count	9		8		19
			% within week	12.0%		10.7%		25.3%
		19th	Count	0		0		0
			% within week	.0%		.0%		.0%
		36th	Count	0		0		0
			% within week	.0%		.0%		.0%
	Total		Count	9		8		19
			% within week	4.0%		3.6%		8.4%
Female	week	1st	Count	11	1	9	1	18
			% within week	13.3%	1.2%	10.8%	1.2%	21.7%
		19th	Count	0	0	0	0	0
			% within week	.0%	.0%	.0%	.0%	.0%
		36th	Count	0	0	0	0	0
			% within week	.0%	.0%	.0%	.0%	.0%
	Total		Count	11	1	9	1	18
			% within week	4.4%	.4%	3.6%	.4%	7.2%

ANOVA testing

The procedure known as the *Analysis of Variance* or *ANOVA* is used to test hypotheses concerning means when we have several populations. ANOVA is a general technique that can be used to test the hypothesis that the means among two or more groups are equal, under the assumption that the sampled populations are normally distributed. In this study, the ANOVA was used to test the hypothesis that the means among the week 1, week 19 and week 36 are equal, under the assumption that the sample was normally distributed. **Table 44,45,46,47** shows analytical the results of the ANOVA test for all four checklists.

ANOVA for checklist A. The Initial hypothesis is that the means of the questions from week to week were equal (H_0 $\mu_1=\mu_{19}=\mu_{36}$). The alternative hypothesis is that at least a couple of the means is not equal. When the p-value (sig) is <0.005 then the original hypothesis is rejected. For all the questions (except one) of checklist A the p-value (sig) was <0.005 therefore the original hypothesis is rejected as there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005). For the question regarding the consumption of the correct number of servings of food sources of vitamin C there was not enough statistical evidence to say that there was difference in the means (p-value > 0.005).

Table 44. ANOVA for Checklist A

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
1.How many times a week do you eat red meat?	Between Groups	337,438	2	168,719	316,106	,000
	Within Groups	252,994	474	,534		
	Total	590,432	476			
2.How many ounces of red meat constitute your normal portion?	Between Groups	165,539	2	82,769	221,914	,000
	Within Groups	176,792	474	,373		
	Total	342,331	476			
3.What kind of red meat do you usually choose?	Between Groups	319,031	2	159,516	366,795	,000
	Within Groups	206,138	474	,435		
	Total	525,170	476			
4.How many times a week do you eat seafood?	Between Groups	325,841	2	162,920	761,609	,000
	Within Groups	101,396	474	,214		
	Total	427,237	476			
5.How many ounces of poultry or seafood do you eat for a serving?	Between Groups	257,136	2	128,568	190,756	,000
	Within Groups	319,472	474	,674		
	Total	576,608	476			
6.Do you remove the skin from poultry?	Between Groups	104,805	2	52,403	206,363	,000
	Within Groups	120,365	474	,254		
	Total	225,170	476			
7.How many times a week do you eat at least one half-cup serving of legumes?	Between Groups	81,941	2	40,971	127,806	,000
	Within Groups	151,950	474	,321		
	Total	233,891	476			
8.What kind of milk do you drink?	Between Groups	330,331	2	165,166	304,200	,000
	Within Groups	257,358	474	,543		
	Total	587,690	476			
9.What kind of cheese do you usually eat?	Between Groups	482,881	2	241,440	480,572	,000
	Within Groups	238,138	474	,502		
	Total	721,019	476			
10.How many servings of low-fat, high-calcium foods do you eat daily?	Between Groups	159,614	2	79,807	413,384	,000
	Within Groups	91,509	474	,193		
	Total	251,124	476			
11.What kind of bread do you eat most often?	Between Groups	237,824	2	118,912	339,801	,000
	Within Groups	165,874	474	,350		
	Total	403,698	476			
12.Which is part of your most typical breakfast?	Between Groups	184,080	2	92,040	430,261	,000
	Within Groups	101,396	474	,214		
	Total	285,476	476			
13.What kind of sauce or topping is usually on the pasta you eat?	Between Groups	359,954	2	179,977	1001,635	,000
	Within Groups	85,170	474	,180		
	Total	445,124	476			
14.Which would you be most likely to order at a Chinese restaurant?	Between Groups	94,050	2	47,025	62,416	,000
	Within Groups	357,119	474	,753		
	Total	451,170	476			

15.Which would you be most likely to choose as toppings for pizza?	Between Groups	202,277	2	101,138	280,462	,000
	Within Groups	170,931	474	,361		
	Total	373,208	476			
16.What is the most typical snack for you?	Between Groups	408,860	2	204,430	386,995	,000
	Within Groups	250,390	474	,528		
	Total	659,249	476			
17.How many half-cup servings of a high vitamin C fruit or vegetable do you eat daily?	Between Groups	,340	2	,170	,785	,457
	Within Groups	102,491	474	,216		
	Total	102,830	476			
18.How many half-cup servings of a high vitamin A fruit or vegetable do you eat daily?	Between Groups	75,287	2	37,644	209,500	,000
	Within Groups	85,170	474	,180		
	Total	160,457	476			
19.What kind of salad dressing do you most often choose?	Between Groups	133,589	2	66,795	290,046	,000
	Within Groups	109,157	474	,230		
	Total	242,746	476			
20.What do you usually spread on bread, rolls, or bagels?	Between Groups	91,975	2	45,987	60,011	,000
	Within Groups	363,233	474	,766		
	Total	455,208	476			
21.What spread do you usually choose for sandwiches?	Between Groups	305,711	2	152,855	426,228	,000
	Within Groups	169,987	474	,359		
	Total	475,698	476			
22.Which frozen dessert do you usually choose?	Between Groups	1027,358	2	513,679	1607,455	,000
	Within Groups	151,472	474	,320		
	Total	1178,830	476			
23.How many cups of caffeinated beverages	Between Groups	190,881	2	95,440	196,378	,000
	Within Groups	230,365	474	,486		
	Total	421,245	476			
24.How many total cups of fluid do you drink in a typical day?	Between Groups	338,231	2	169,115	309,779	,000
	Within Groups	258,767	474	,546		
	Total	596,998	476			
25.What kind of cereal do you eat?	Between Groups	405,539	2	202,769	809,767	,000
	Within Groups	118,692	474	,250		
	Total	524,231	476			
26.How many times a week do you eat fried foods?	Between Groups	99,371	2	49,686	380,626	,000
	Within Groups	61,874	474	,131		
	Total	161,245	476			
27.How many times a week do you eat cancer-fighting cruciferous vegetables?	Between Groups	195,736	2	97,868	358,193	,000
	Within Groups	129,509	474	,273		
	Total	325,245	476			

ANOVA for checklist B. The Initial hypothesis is that the means of the questions from week to week were equal (H_0 $\mu_1=\mu_{19}=\mu_{36}$). The alternative hypothesis is that at least a couple of the means is not equal. When the p-value (sig) is <0.005 then the original hypothesis is rejected. For all the questions of checklist B the p-value (sig) was <0.005 therefore the original hypothesis is rejected as there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005).

Table 45. ANOVA for Checklist B

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
How often do you exercise?	Between Groups	114,333	2	57,167	196,791	,000
	Within Groups	136,823	471	,290		
	Total	251,156	473			
How long do you exercise?	Between Groups	70,215	2	35,108	79,474	,000
	Within Groups	208,063	471	,442		
	Total	278,278	473			
How hard do you exercise?	Between Groups	125,557	2	62,778	244,075	,000
	Within Groups	121,146	471	,257		
	Total	246,703	473			
Activity Index Level	Between Groups	276,637	2	138,319	337,599	,000
	Within Groups	192,975	471	,410		
	Total	469,612	473			

ANOVA for checklist C. The Initial hypothesis is that the means of the questions from week to week were equal (H_0 $\mu_1=\mu_{19}=\mu_{36}$). The alternative hypothesis is that at least a couple of the means is not equal. When the p-value (sig) is <0.005 then the original hypothesis is rejected. For all the questions (except one) of checklist C the p-value (sig) was <0.005 therefore the original hypothesis is rejected as there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005). For the question regarding the reasons of eating because felling good, happy or relaxed there was not enough statistical evidence to say that there was difference in the means (p-value > 0.005).

Table 46. ANOVA for Checklist C.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Arguing or having a conflict with someone	Between Groups	187,560	2	93,780	27,553	,000
	Within Groups	1613,308	474	3,404		
	Total	1800,868	476			
Being with others when they are eating while not eating	Between Groups	798,193	2	399,096	172,618	,000
	Within Groups	1095,899	474	2,312		
	Total	1894,092	476			
Being urged to eat by someone else	Between Groups	617,069	2	308,535	76,640	,000
	Within Groups	1908,214	474	4,026		
	Total	2525,283	476			
Feeling inadequate around others	Between Groups	430,503	2	215,252	54,979	,000
	Within Groups	1855,799	474	3,915		
	Total	2286,302	476			
Social Score	Between Groups	7307,338	2	3653,669	137,679	,000
	Within Groups	12578,792	474	26,538		
	Total	19886,130	476			
Feeling bad, such as being anxious or depressed	Between Groups	541,597	2	270,799	106,086	,000
	Within Groups	1209,950	474	2,553		
	Total	1751,547	476			
Feeling good, happy, or relaxed	Between Groups	15,547	2	7,774	2,093	,124
	Within Groups	1760,528	474	3,714		
	Total	1776,075	476			
Feeling bored or having time on my hands	Between Groups	258,067	2	129,034	23,504	,000
	Within Groups	2602,189	474	5,490		
	Total	2860,256	476			
Feeling stressed or excited	Between Groups	849,170	2	424,585	112,739	,000
	Within Groups	1785,132	474	3,766		
	Total	2634,302	476			
Emotional Score	Between Groups	5081,941	2	2540,971	106,079	,000
	Within Groups	11354,000	474	23,954		
	Total	16435,941	476			
Seeing an advertisement for food or eating and wanting to eat	Between Groups	315,790	2	157,895	30,261	,000
	Within Groups	2473,208	474	5,218		
	Total	2788,998	476			
Passing by a bakery, cookie shop, or other enticement to eat	Between Groups	398,579	2	199,289	40,017	,000
	Within Groups	2360,553	474	4,980		
	Total	2759,132	476			
Being involved in a party, celebration, or special occasion	Between Groups	273,614	2	136,807	33,427	,000
	Within Groups	1939,962	474	4,093		
	Total	2213,577	476			

Eating out	Between Groups	1238,558	2	619,279	243,114	,000
	Within Groups	1207,409	474	2,547		
	Total	2445,966	476			
Situational Score	Between Groups	7920,155	2	3960,078	196,225	,000
	Within Groups	9565,937	474	20,181		
	Total	17486,092	476			
Making excuses to myself about why it's OK to eat	Between Groups	1253,824	2	626,912	226,038	,000
	Within Groups	1314,629	474	2,773		
	Total	2568,453	476			
Berating myself for being so fat or unable to control my eating	Between Groups	494,545	2	247,273	153,952	,000
	Within Groups	761,321	474	1,606		
	Total	1255,866	476			
Worrying about others or about difficulties I am having	Between Groups	537,174	2	268,587	207,167	,000
	Within Groups	614,528	474	1,296		
	Total	1151,702	476			
Thinking about how things should or shouldn't be	Between Groups	544,239	2	272,119	80,001	,000
	Within Groups	1612,289	474	3,401		
	Total	2156,528	476			
Thinking Score	Between Groups	10536,130	2	5268,065	259,331	,000
	Within Groups	9628,855	474	20,314		
	Total	20164,985	476			
Experiencing pain or physical discomfort	Between Groups	122,922	2	61,461	47,262	,000
	Within Groups	616,403	474	1,300		
	Total	739,325	476			
Experiencing trembling, headache, or light headedness associated with no eating or too much caffeine	Between Groups	415,249	2	207,625	63,644	,000
	Within Groups	1546,314	474	3,262		
	Total	1961,564	476			
Experiencing fatigue or feeling overtired	Between Groups	577,124	2	288,562	98,471	,000
	Within Groups	1389,019	474	2,930		
	Total	1966,143	476			
Experiencing hunger pangs or urges to eat, even though I've eaten recently	Between Groups	707,338	2	353,669	101,744	,000
	Within Groups	1647,648	474	3,476		
	Total	2354,985	476			
Physiological Score	Between Groups	6691,170	2	3345,585	287,205	,000
	Within Groups	5521,509	474	11,649		
	Total	12212,679	476			
TOTAL SCORE	Between Groups	184424,834	2	92212,417	275,481	,000
	Within Groups	158663,409	474	334,733		
	Total	343088,243	476			

ANOVA for checklist D. The Initial hypothesis is that the means of the questions from week to week were equal (H_0 $\mu_1=\mu_{19}=\mu_{36}$). The alternative hypothesis is that at least a couple of the means is not equal. When the p-value (sig) is <0.005 then the original hypothesis is rejected. For all the questions (except two) of checklist D the p-value (sig) was <0.005 therefore the original hypothesis is rejected as there is enough statistical evidence to say that there is a difference in the means (p-value < 0.005). For the questions regarding the reasons of not exercising as Injury and Health Problems and/or Chronic Physical Discomfort there were not enough statistical evidences to say that there were difference in the means (p-value > 0.005).

Table 47. ANOVA for Checklist D

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
No time in my busy schedule	Between Groups	,713	2	,357	2,367	,095
	Within Groups	70,949	471	,151		
	Total	71,662	473			
No Energy	Between Groups	38,063	2	19,032	190,953	,000
	Within Groups	46,943	471	,100		
	Total	85,006	473			
I'm too tired	Between Groups	20,089	2	10,044	57,383	,000
	Within Groups	82,443	471	,175		
	Total	102,532	473			
Lack of discipline	Between Groups	3,308	2	1,654	30,355	,000
	Within Groups	25,665	471	,054		
	Total	28,973	473			
Too hard... there's got to be an easier way	Between Groups	3,308	2	1,654	30,355	,000
	Within Groups	25,665	471	,054		
	Total	28,973	473			
Discouraging.	Between Groups	,342	2	,171	7,089	,001
	Within Groups	11,354	471	,024		
	Total	11,696	473			
Not enjoyable	Between Groups	1,523	2	,762	21,460	,000
	Within Groups	16,715	471	,035		
	Total	18,238	473			
Bad experience	Between Groups	,342	2	,171	7,089	,001
	Within Groups	11,354	471	,024		
	Total	11,696	473			
Expense of equipment, clothes, membership	Between Groups	1,523	2	,762	21,460	,000
	Within Groups	16,715	471	,035		
	Total	18,238	473			

Distance	Between Groups	,000	2	,000	.	.
	Within Groups	,000	471	,000		
	Total	,000	473			
Inconvenience	Between Groups	6,418	2	3,209	51,454	,000
	Within Groups	29,373	471	,062		
	Total	35,791	473			
Boredom	Between Groups	6,418	2	3,209	51,454	,000
	Within Groups	29,373	471	,062		
	Total	35,791	473			
Lack of variety	Between Groups	1,688	2	,844	22,754	,000
	Within Groups	17,468	471	,037		
	Total	19,156	473			
Injury/Health Problems	Between Groups	,068	2	,034	,153	,859
	Within Groups	104,247	471	,221		
	Total	104,314	473			
Chronic Physcial Discomfort	Between Groups	,422	2	,211	,842	,431
	Within Groups	117,975	471	,250		
	Total	118,397	473			
Embarassment	Between Groups	5,468	2	2,734	11,841	,000
	Within Groups	108,759	471	,231		
	Total	114,228	473			
Social Discomfort	Between Groups	12,304	2	6,152	34,394	,000
	Within Groups	84,247	471	,179		
	Total	96,551	473			
Lack of understanding of the benefits	Between Groups	4,595	2	2,297	12,955	,000
	Within Groups	83,525	471	,177		
	Total	88,120	473			
Low Priority	Between Groups	6,751	2	3,376	49,149	,000
	Within Groups	32,348	471	,069		
	Total	39,099	473			
Apathy	Between Groups	14,194	2	7,097	91,060	,000
	Within Groups	36,709	471	,078		
	Total	50,903	473			
Don't care to	Between Groups	6,093	2	3,046	49,717	,000
	Within Groups	28,861	471	,061		
	Total	34,954	473			
Weather conditions	Between Groups	6,418	2	3,209	51,454	,000
	Within Groups	29,373	471	,062		
	Total	35,791	473			

CHAPTER 5

RECOMMENDATIONS, CONCLUSIONS, REFLECTION, STRENGHTS & LIMITATIONS

Obesity is a complex, multifactorial condition in which excess body fat may put a person at health risk. World health organization data indicate that the prevalence of obesity in the developed countries is increasing in children and adults. Reversing these trends requires changes in individual behaviour and the elimination of societal barriers to healthy lifestyle choices. Basic treatment of overweight and obese WLC requires a broad approach involving diet and nutrition, regular physical activity, and behavioural change, with an emphasis on long-term weight management rather than short-term extreme weight reduction. Dietitians and other health professionals have an important role in promoting preventive measures and encouraging positive lifestyle behaviours, as well as identifying and treating obesity-related comorbidities. Health professionals also have a role in counseling people about safe and effective weight loss and weight maintenance programs.
The main focus of this project was to develop guidelines for the management of overweight and obese adults. In developing recommendations, it was assumed that in most adults the benefits of weight loss on overall health exceed harmful effects and that many people can maintain weight loss, with resulting long-term health benefits.

Based on the results of the current research, it is recommended that the treatment for obesity involves a two-step process of assessment and management. Assessment entails determination of the degree of overweight and a patient's overall risk status. This determination encompasses evaluation of total body fat, abdominal body fat and various risk factors for diseases and conditions associated with obesity, including a family history of obesity-related disease. BMI is significantly correlated with total body fat content and should be used to assess overweight and obesity as well as to monitor changes in body weight. Abdominal fat content should be assessed before and during weight loss treatment by measurement of waist circumference.

Factors to Consider When Evaluating Disease Risk Status in Adults

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Assess degree of overweight based on BMI

Assess presence of abdominal obesity based on waist circumference

Assess presence of underlying diseases and conditions:

Coronary heart disease

Other atherosclerotic diseases:

- Peripheral arterial disease
- Abdominal aortic aneurysm
- Symptomatic carotid artery disease

Type 2 (formerly non–insulin-dependent) diabetes mellitus

Sleep apnea

Gynecologic abnormalities

Osteoarthritis

Stress incontinence

Gallstones and their complications

Assess presence of cardiovascular disease risk factors:

Cigarette smoking

Hypertension

High low-density lipoprotein cholesterol

Low high-density lipoprotein cholesterol

Impaired fasting glucose

Family history of premature coronary heart disease

Age (men ≥45 years; women ≥55 years or postmenopausal)

Assess other risk factors:

Physical inactivity

Elevated serum triglyceride level

BMI = body mass index.

Adapted from National Institutes of Health, National Heart, Lung, and Blood Institute, (1998, pp 51S–209S), 'Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults the evidence report'.

Behaviour Modification Treatment focused in Eating Habits and Exercise

Treatment is recommended for people with a BMI of 25.0 to 29.9 kg per m^2 or a high waist circumference, and two or more risk factors. Treatment is also recommended for WLC (weight Loss Candidates) with a BMI of 30 or more kg per m^2 regardless of risk factors. Overweight persons without risk factors should be encouraged to avoid further weight gain. When determining treatment options, possible co morbidities should be considered as well as the patient's motivation to lose weight. General treatment goals are to reduce body weight, maintain a lower body weight over the long term, and prevent further weight gain and control accompanying disease risk factors. Effective approaches include dietary therapy, increasing physical activity, behaviour therapy and combinations of these techniques. A combined intervention consisting of a low-calorie diet, increased physical activity and behaviour therapy is the most effective therapy for weight loss and maintenance as shown in the results of this study in chapter 4. As an initial goal, this regimen maintained for at 36 weeks, and the patient strived for a 10 percent reduction from initial body weight. Ongoing treatment then focuses on altering or sustaining lifestyle behaviours to produce further weight loss, maintaining the desired weight and, ultimately, avoiding additional weight gain.

Treatment Results

Because behaviour modification covers various methods with differing applications and because these methods are applied with various eating and exercise regimens, it is difficult to assess the unique effect of behaviour modification or the contributions of a particular treatment component. Many comprehensive reviews of weight loss programmes using behaviour modification have been published (Traverso 2000). However, the programme, the average duration of behavioural treatment was proven to be 36 weeks in total which this included 18 weeks weight loss with behaviour modification and 18 weeks for maintenance and behaviour modification. Average weight loss was 11.96 kg for weight loss period with an average of weight loss of 0.66kg per week. Overweight and moderately obese WLC could expect to lose 13.96% of their body weight. The average duration of follow-up monitoring was 18 weeks. The 48% of the WLC maintained the weight lost during the maintenance/ follow up period (36 weeks) and another 50% continued to lose an average of 1.27kg. Because weekly weight losses during treatment remained relatively constant at 0.66 kg, longer treatment seemed to result in greater weight losses. This effect may be due to extended contact with the researchers- dietitians for private or group consultation and to increased exposure to behaviour modification techniques.

Maintenance Results

The main problem with all treatments for obesity is a slow return to baseline weight after treatment intervention ends. The process of eating lapses and relapse have been studied from many years ago (Schlundt 1989), but the longitudinal processes need further investigation. The evidence for the greater effectiveness of longer treatment and follow-up periods and the long duration of the problem emphasize the need for a continuous-care model for obesity. This studyhas shown that maintenance of modest weight losses can be achieved by using combinations of strategies during the post-treatment period. In this study, the therapist/dietitian support with individual and group sessions for the reinforcement of eating behaviour and exercise maintenance were utilized.

The following table (table 1) summarizes the Behaviour Therapy techniques used and it proceeds with an analysis of each point.

Table 1. Summary of Behaviour Therapy Techniques and Tools for Weight Management

Behavioural Therapy Sessions/Project Actions		**Tools developed/modified and used (see Protocol and Guidelines)**
1. Getting Started	Presents an outline of behavioural approach. Prescribes a ½ - 1 kg/week weight loss goal and an individual diet plan and goal to achieve this weight loss.	1. Nutritional & Physical Fitness Assessment Questionnaire: 2. A brief Behavioural Assessment 3. Ready or Not Estimating Weight Loss (i.e set realistic goals) 4. Appendix J. Goal Setting and Recording for Weight Management 5. Progress Chart for Anthropometric Measurements
2. Self-Monitoring	Teaches the value of recording immediately and, directly. Helps WLCBs[1] learn to find calorie values by using a reference book and reading food labels.	1. Food and Exercise Diaries (every visit) *2.* Checklists (week 1, 18 and 36): Checklist A – Identify your eating habits Checklist B - Identify your Physical Activity Level Checklist C - What Influences Eating

		Behaviour? Checklist D - What influences the Physical Activity? 3. Appendix B. Shopping- Food Labeling- Traffic Lights 4. Appendix L. Glycemic Index
3. Modifying Diet	Stresses the importance of restricting dietary fat intake. Teaches common sources of dietary fat and strategies to lower fat.	1. Appendix C. Nutrient and Calorie Modifications 2. Appendix D. Food Exchange List 3. Appendix E. Menus with Lower Calories 4. Appendix F. Cooking Can be Healthy and Tasty 5. Checklist A and C
4. Increasing Physical Activity	Introduces the importance of physical activity for energy balance and prescribes activity goals that gradually increase over the course of the programme.	1. Appendix H. The Physical Activity Guidelines 2. Checklist B and D
5. Stimulus Control	Teaches WLCBs to remove cues for wrong behaviours and increase cues for appropriate behaviours.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercising

6. Changing the Act of Eating	Emphasizes the significance of eating slowly, eating in designated locations, and eating a variety of different foods. Often integrates discussion of dinning out and the food guide pyramid and the food plate.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercising 2. Appendix G. Dinning Out—Use of the Food Plate Model.
7. Problem Solving	Educates WLCBs to identify problem areas or barriers related to eating or exercise, to brainstorm solutions to their problems, and then select one to implement.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercising
8. Social Support	Helps WLCBs to learn to ask others for the type of support they need to change their behaviours.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercise
9. Restaurant Eating	Demonstrates tactics for managing eating away from home.	1. Appendix G. Dinning Out—Use of the Food Plate Model.
10. Changing Cognitions	Teaches WLCBs to distinguish their	1. Appendix I. Behaviour Modification Guidelines For

	negative thoughts and counter them with positive re-framing. Positive and negative reinforcement.	Eating and Exercising 2. ABC Method
11. Managing Stress	Assist WLCBs learn to recognize sources of stress in their lives, examine the association between stress and eating, and develop new strategies for dealing with stress.	2. Appendix H. The Physical Activity Guidelines 3. Appendix I. Behaviour Modification Guidelines For Eating and Exercise 4. Appendix J. Goal Setting and Recording for Weight Management 5. Appendix K. Food and Physical Activity Diary
12. Motivational	Guide WLCBs how to develop motivational strategies to help them maintain their habit changes long-term.	Appendix N. Progress Chart Lifestyle, Diet, and Physical Activity Appendix K. Food and Physical Activity Diary
13. Relapse Prevention	Educate WLCBs to recognize high risk situations, plan for these situations, and to keep lapses from leading to relapse.	Appendix I. Behaviour Modification Guidelines For Eating and Exercising

[1] WLCB – Weight Loss Candidate with Behaviour Modification

Analysis of the Behaviour Therapy Techniques.

Below there is an analysis and explanation of the Behaviour Modification Techniques presented in table 1. The guidelines and advices for the WLCBs are presented in the way they were given to them. Further explanation for these is found in the protocol.

1. GETTING STARTED

Setting weight goals

Individuals with a BMI >25 (overweight) and those with a BMI >30 (obese) were counseled on the importance of weight management. Cardiovascular risk factors were assessed, and weight loss recommended in those with a BMI >30 or a BMI 25-29.9 or waist circumference >80 cm (F) or > 102 cm (M) AND > 2 risk factors.

WLCB were encouraged to lose 1/2-1 kg /week. Subsequently, efforts were directed at maintaining the weight loss in the 36 weeks of maintenance. It is important to counsel WLC on achievable weight losses and attempt to reduce the discrepancy between the desired and the achievable outcomes.

The average length of weight loss treatment was 18 weeks for the intervention and the control groups, and the average weight loss for the intervention group was 11.96kg (t-test ,p-value $\leq$ 0.001) and for the control group was 5.56kg (t-test, p-value$\leq$ 0.002). During the 18 weeks of the maintenance period the 50% of the intervention group continued to lose while an additional 48% of them maintained the weight and only 2% of them gained weight

2. SELF MONITORING WEIGHT

For the purpose of our research we weighed WLCB every two week. In addition, WLCB were instructed to weight themselves at home at regular intervals, either daily or at least once a week. Data from the National Weight Control Registry suggest that successful

weight losers monitor their weight quite closely. This frequent monitoring allows them to promptly take steps to correct any small increases in weight that they observe

3. MODIFYING DIETARY INTAKE

Behaviour

At the beginning of the program, participants were assigned a diet plan with a calorie goal designed to produce a ½-1/week weight loss. In this study specifically both groups (control and intervention) received an energy restricted diet (1500 ± 200 kcal/day for women and 1800 ± 200 kcal/day for men).

In this behavioural program WLCB were encouraged not only to reduce their overall calories, but also to improve eating habits such as lower their fat intake to 20-30% of their calories in order to improve weight loss and lipid responses to weight loss. The combination of restricting dietary fat and calories has been shown to be more effective then fat restriction alone or calorie restriction alone. Moreover, reducing fat intake and decreasing consumption of specific high fat food (beef, hot dogs, cheese, French fries, sweets) have been shown to be related to maintenance of weight loss. For simplicity, participants are given a fat goal in grams of fat/day (e.g. participants on a 1500 kcal diet are instructed to consume 30-45 grams of fat for a diet of 20% - 30% fat).

WLCB were asked to complete a questionnaire, checklists and keep diaries about their diet, exercise, and general weight control behaviours.

Self-Monitoring Calorie and Fat Intake. WLCB were instructed to record all food and drinks they consume and the calories and fat grams in those foods. By adding up their fat and calorie intake after each meal, weight loss candidate can measure the amount remaining for later meals. Such self-monitoring is prescribed and checked biweekly for the first 18 weeks of the weight loss program. Continued self-monitoring of intake is one of the strongest predictors of maintenance of weight loss.

Improving the quality of foods selected. WLCB were encouraged to select foods that will provide the greatest nutritional benefit for the fewest calories. The emphasis is on reducing overall intake of fat. Strategies were provided for improving quality of foods consumed at home and when eating out. For example, WLCB were educated to consume small frequent meals, increase fiber consumption, to limit use of fat in food preparation and flavoring of foods, and to modify preferred recipes for healthier eating.

Providing Increased Structure concerning Diet. There have been several recent studies suggesting that providing structure to WLCB on what they should eat, and thus simplifying choices, preparation time, etc., can be very helpful in promoting dietary obedience. In addition more WLCB were provided with a specific meal plan, representing precisely what must be eaten for each meal and a grocery list to buy these items was also more successful than simply allowing WLCB to self-select their diet.

4. INCREASING PHYSICAL ACTIVITY

There have been a number of randomized controlled trials comparing the effects on weight loss of diet only, exercise only, and the combination (NHLBI 2004). These studies suggest that exercise alone has very small effects on body weight, and that adding exercise to a diet program increases initial weight loss by approximately 2 kg. These modest effects of exercise may well be due to the low dose of exercise used in many of these trials and the short duration of the studies. The greatest benefits of exercise are seen in the maintenance of weight loss. Of six studies that have examined long-term weight losses in diet only versus diet plus exercise, all six found that the latter had better outcomes, although in many of these studies the difference was not statistically significant (Wing et al 1999). Correlational data are even stronger in suggesting the benefits of long term physical activity for maintenance of weight loss (Pronk et al 1994).

WLCB were encouraged to increase their physical activity slowly, in order to avoid injury, and to check with their physician before undertaking strenuous activity. The goal for physical activity in this program was individualized. In general WLCB were instructed to gradually increase their activity until they achieve a level of at least 1000 kcal/week.

WLCB were able to choose exactly what types of exercise they enjoy, but most use walking for the majority of their activity. A good rule of thumb is that walking 1 mile will burn approximately 150 kcal (heavier WLCB will burn more calories). Calories from other types of activities were calculated. Alternatively WLCB were assigned a goal of achieving at least 150 minutes/week of physical activity, using brisk walking or activities of similar intensity to brisk walking (Mahler 1995). Checklist b was given at the 1st, 18th and 36th week. Acitivy index was measured and WLCB improved from sedentary to moderate by the end of the 18th week (weight loss period).

*Self-Monitoring Physical Activity.*WLCB in this program was instructed to record all activities they completed. WLCB record either calories used in activity or minutes of activity.

Increasing Lifestyle Activity. WLCB in this behavioural weight loss program were helped to identify ways in which they can spend more energy in their daily activities, e.g. parking further from the store, using stairs, getting off the bus one stop earlier. Even though these lifestyle behaviour changes can add up over time to significant increases in energy expenditure, they are difficult to quantify and hard to record in self-monitoring diaries. Therefore such lifestyle activities were viewed as a supplement to longer, more structured activity/exercise bouts.

Dividing exercise into multiple short bouts. The number one barrier to exercise in this study was lack of time. To address this problem, WLCB found easier to exercise for multiple 10-minute bouts rather than one 40-minute bout. Several studies have examined this issue. In a study done by Jakicic et al 1995, WLCB were randomly assigned to exercise in one 40-minute bout/day, 5 days/week or to complete four 10-minute bouts on each of the 5 days. All other aspects of the weight loss programs were identical in the two conditions. The short-bout program produced better initial adherence and comparable long-term changes in weight and cardiovascular fitness to the long-bout program. Thus, exercising in multiple bouts may be a useful option for some participants.

Decreasing sedentary activities such as TV time. Epstein and colleagues compared the effects of increasing physical activity, decreasing sedentary behaviour, and the combination of the two in a study of overweight children aged 8-12. The sujects who were asked to decrease sedentary time had the best long-term weight control outcome and comparable improvements in fitness to the other conditions. These results suggest that as the WLCB decreased sedentary activities they adopted other more physically active pursuits (and thus improved fitness).

Decreasing barriers for physical activity. WLCB were taught strategies for dealing with common barriers to exercise, e.g. exercising in hot weather or cold weather; appropriate stretching exercises to prevent injuries. Motivation for physical activity was increased by encouraging WLCB to do a variety of different activities that they enjoy and helping WLC recognize the improvements in fitness that occurs with regular exercise (i.e. walking in the park with a friend. Exercise during lunch break with a colleague).

5. STIMULUS CONTROL

Teaches WLCBs to remove cues for wrong behaviours and increase cues for appropriate behaviours.

6. CHANGING THE ACT OF EATING

Many adults struggle with eating behaviours that lead to weight gain. Some behaviour changes that were made in this study were to eat before shopping because then food doesn't seem as appealing. Also eating only at a designated spot, and keeping high-calorie foods out of the house or work environment helped the WLCB.

7. PROBLEM SOLVING

Teaches WLCBs to identify problem areas or barriers related to eating or exercise, to brainstorm solutions to their problems, and then select one to implement (ie. Lack of time, give ideas of exercises that don’t take much time out of WLCB, like walking up the stairs, or park not very close to work).

8. SOCIAL SUPPORT

Behavioural approaches assume that the environment is an important determinant of behaviour. Most notably, the physical environment, including the sight and smell of food, can trigger feelings of hunger and influence what types of foods are selected. Other types of environmental cues can also be important. Eating and exercise behaviours can be influenced by social cues (the behaviours or attitudes of others around the WLCB) and by cognitive cues (thoughts and feelings about eating, exercise and body weight). Thus behavioural approaches include techniques to change physical, social, and cognitive cues.

9. RESTAURANT EATING

The following strategies were applied in this study. **Follow the food plate model.** – *The international guidelines for food plate model*

Make careful menu selections – pay attention to the descriptions on the menu. Dishes labeled deep-fried, pan-fried, basted, batter-dipped, breaded, creamy, crispy, scalloped, Alfredo, au gratin or in cream sauce are usually high in calories, unhealthy fats or sodium. Order items with more vegetables and choose leaner meats.

Drink water with your meal. Soda is a enormous source of empty calories. About 1 liter of asoft drink offers 425 calories and it can represent a fair portion of the daily calorie intake. Try adding a little lemon to your water or ordering unsweetened iced tea.

“Undress” your food. When choosing items, be aware of calorie- and fat-packed salad dressings, spreads, cheese, sour cream, etc. For example, ask for a grilled chicken sandwich without the mayonnaise. You can ask for a packet of ketchup or mustard and add it yourself, controlling how much you put on your sandwich.

Don't be afraid to special order. Many menu items would be healthy if it weren't for the way they were prepared. Ask for your vegetables and main dishes to be served without the sauces. Ask for olive oil and vinegar for your salads or order the dressing "on the side" and

spoon only a small amount on at a time. If your food is fried or cooked in oil or butter, ask to have it broiled or steamed.

Watch portion size - An average fast food meal can run as high as 1000 calories or more, so choose a smaller portion size, order a side salad instead of fries, and don't supersize anything. At a typical restaurant, a single serving provides enough for two meals. Take half home or divide the portion with a dining partner. Sharing might make dessert (or something else indulgent) more of an option.

Watch your salt. Fast food restaurant food tends to be very high in sodium, a major contributor to high blood pressure. Don't add insult to injury by adding more salt.

Avoid buffets – even seemingly healthy ones like salad bars. You'll likely overeat to get your money's worth. If you do choose buffet dining, opt for fresh fruits, salads with olive oil & vinegar or low-fat dressings, broiled entrees and steamed vegetables. Resist the temptation to go for seconds, or wait at least 20 minutes after eating to make sure you're really still hungry before going back for more.

Eat mindfully. Pay attention to what you eat and savor each bite. Chew your food more thoroughly and avoid eating on the run. Being mindful also means stopping before you are full. It takes time for our bodies to register that we have eaten. Mindful eating relaxes you, so you digest better, and makes you feel more satisfied.

Remember the big picture. Think of eating out in the context of your whole diet. If it is a special occasion, or you know you want to order your favorite meal at a nice restaurant, make sure your earlier meals that day are extra healthy. Moderation is always the key, but planning ahead can help you relax and enjoy your dining out experience while maintaining good nutrition and diet control.

10. CHANGING COGNITIONS

- WLCB were taught to recognize small positive changes in their behaviour and to reward themselves verbally and with small tangible rewards for this progress. Therapist praise and social support from others in the treatment program are also used as reinforcement. In this study we developed a 10 bonus award program for rewarding WLCB by getting special offers to a gym, a sport shop, a spa and a clothing shop (every 1 kilo of weight loss equals to a bonus).
- Furthermore, for the purposes of this study in order to reinforce the cognitive behaviour the ABC method was promoted and adjusted to the needs of the participants with very positive results (Table 2).

Table 2-Examples of Functional Behavioural Assessment Method: ABC

	Antecedents	**Behaviour**	**Consequences**
Checklist A – Identify your eating habits	Eat a lot of meat in high quantities daily and does not consider legumes as a meal. Eat the meat with french fries and no vegetables	Eat legumes in salads mixed with fish and a favorite oil based sauce in a controlled quantity	Eat less saturated fat and less calories
Checklist B - Identify your Physical Activity Level	Live a sedentary life with no exercise	Take the stairs at work and walk to the convenience store daily to buy newspaper	Increase the energy expenditure (calories burned through exercise)
Checklist C - What Influences Eating Behaviour?	Dinning out 3 times per week at 'tavern' style restaurant	Dinning out 3 times a week, order a la carte and use the food plate model	Decrease the caloric intake
Checklist D - What influences the Physical Activity?	Too hot to exercise out and not cost effective to go to the gym	Use a dvd with different exercises and do them at home with the air-condition on	Increase the energy expenditure
Overall Consequence	Unsound behaviour towards eating habits and exercise	Modified Behaviour regarding eating habits and exercise	Weight loss and long lasting maintenance

11. MANAGING STRESS

The following strategies were applied to this study.

- **Learn how to say "no" –** Know your limits and stick to them. Whether in your personal or professional life, refuse to accept added responsibilities when you're close to reaching them. Taking on more than you can handle is a surefire recipe for stress.

- **Avoid people who stress you out** – If someone consistently causes stress in your life and you can't turn the relationship around, limit the amount of time you spend with that person or end the relationship entirely.

- **Take control of your environment** – If the evening news makes you anxious, turn the TV off. If traffic's got you tense, take a longer but less-traveled route. If going to the market is an unpleasant chore, do your grocery shopping online.

- **Avoid hot-button topics** – If you get upset over religion or politics, cross them off your conversation list. If you repeatedly argue about the same subject with the same people, stop bringing it up or excuse yourself when it's the topic of discussion.

- **Pare down your to-do list** – Analyze your schedule, responsibilities, and daily tasks. If you've got too much on your plate, distinguish between the "shoulds" and the "musts." Drop tasks that aren't truly necessary to the bottom of the list or eliminate them entirely.

- **Alter the situation**

  If WLCB couldn't avoid a stressful situation, we encourage them to try to alter it, to figure out what they can do to change things so the problem doesn't present itself in the future. Often, this involves changing the way you communicate and operate in your daily life.

- **Express your feelings instead of bottling them up.** If something or someone is bothering you, communicate your concerns in an open and respectful way. If you don't voice your feelings, resentment will build and the situation will likely remain the same.
- **Be willing to compromise.** When you ask someone to change their behaviour, be willing to do the same. If you both are willing to bend at least a little, you'll have a good chance of finding a happy middle ground.
- **Be more assertive.** Don't take a backseat in your own life. Deal with problems head on, doing your best to anticipate and prevent them. If you've got an exam to study for and your chatty roommate just got home, say up front that you only have five minutes to talk.
- **Manage your time better.** Poor time management can cause a lot of stress. When you're stretched too thin and running behind, it's hard to stay calm and focused. But if you plan ahead and make sure you don't overextend yourself, you can alter the amount of stress you're under.

- **Adapt to the stressor**

  If WLCB couldn't change the stressor, we encouraged them to change themselves. You can adapt to stressful situations and regain your sense of control by changing your expectations and attitude.

  - **Reframe problems.** Try to view stressful situations from a more positive perspective. Rather than fuming about a traffic jam, look at it as an opportunity to pause and regroup, listen to your favorite radio station, or enjoy some alone time.
  - **Look at the big picture.** Take perspective of the stressful situation. Ask yourself how important it will be in the long run. Will it matter in a month? A year? Is it really worth getting upset over? If the answer is no, focus your time and energy elsewhere.
  - **Adjust your standards.** Perfectionism is a major source of avoidable stress. Stop setting yourself up for failure by demanding perfection. Set

reasonable standards for yourself and others, and learn to be okay with "good enough."

- **Focus on the positive.** When stress is getting you down, take a moment to reflect on all the things you appreciate in your life, including your own positive qualities and gifts. This simple strategy can help you keep things in perspective.

12. MOTIVATIONAL

WLCB were encouraged to develop motivational strategies to help them maintain their habit changes long-term (i.e. fit into smaller sized clothes when lost weight and get rid of the bigger ones, set goals, joined a group with similar goals, regular visits to the dietitian reward yourself along the way).

13. RELAPSE PREVENTION

Relapse is common during lifestyle changes. In this study the maintenance period for weight management helped the WLCB maintained their weight or continue to lose weight by 98%. In the cases where a relapse had occurred, they had learned something new about themselves and about the process of changing behaviour. For example the subject on weight management who were on a restricted diet learned that they could be successful in adhering to the diet if they order from a menu rather than choose the all-you-can-eat buffet. Focusing on the successful part of the plan ("You did it for 18 weeks; what made that work?") shifts the focus from failure, promotes problem solving and offers encouragement. The goal here was to support WLCB and re-engage their efforts in the change process. They were left with a sense of realistic goals to prevent discouragement, and their positive steps toward behaviour change should be acknowledged.

Conclusions

Behavioural techniques have been combined successfully with a sensible level of calories (1500kcal ±200 for female and 1800kcal ± 200 for male) without the need to follow very-low-calorie diet (VLCDs). Very low calorie diet (VLCD) is a diet with very or *extremely* low calorie consumption per day. It is defined medically as a diet of 800 kilocalories per day or less (Howard 1981). This study with the duration of 36 weeks (18 weeks weight loss and 18 weeks maintenance with a behaviour modification in exercise and nutrition habits and follow up) showed that behaviour therapy combined with regular diet[1] with caloric restriction (a total of 500 kcal less of the Total Daily Caloric Expenditure calculated with the use of the Harris Benedict Equation) resulted in 98% of the WLC maintaining end-of-treatment losses compared with 86% of those receiving a caloric restricted diet alone. The proposed behaviour modification program with the caloric restricted diet and regular exercise resulted in an average weight loss of 11.96 kg compared to the 5.56kg lost by those with the caloric restricted diet at the same period of time. When weight loss is necessary, a useful guideline for lowering the calorie intake is to reduce the calories by at least 500, but not more than 1000 below the maintenance level. For people with only a small amount of weight to lose, 1000 calories will be too much of a deficit. As a guide to minimum calorie intake calorie levels never drop below 1200 calories per day for women or 1800 calories per day for men.

The main principle in behaviour therapy is that WLCB must learn dietary restraint to resist unhealthful eating habits. Presumably, restraint usually fails due to increased hunger. It is important to focus on realistic weight goals. Because behavioural treatment does not usually result in dramatic weight loss for most WLCB, two aspects of treatment are receiving increasing emphasis. First, WLCB should be motivated to change their

[1] Regular or normal diet is a full, well-balanced diet containing all of the essential nutrients needed for optimal growth, tissue repair, and normal functioning of the organs. Such a diet contains foods rich in proteins, carbohydrates, high-quality fats, minerals, and vitamins in proportions that meet the specific caloric requirements of the individual (Mosby's Medical Dictionary 2009).

behaviours to improve health rather than to achieve a particular weight to satisfy their self-importance. Second, weight losses in the range achieved by behavioural methods can produce significant improvements in health and can reduce risk factors for disease.

Recommendations for Evaluation and Action plan

When dietitians meet WLCBs in the clinical setting, opportunities exist for identifying overweight and obesity and their supplementary risk factors, as well as for initiating treatments for reducing weight, risk factors, and chronic diseases such as CVD and type 2 diabetes. When assessing a WLCB for treatment of overweight and obesity, consider the WLCB's weight, waist circumference, and presence of risk factors. The strategy for the evaluation and treatment of overweight WLCBs is presented in Figure 1 (a) (Treatment Algorithm). This algorithm applies only to the assessment for overweight and obesity; it does not reflect the overall evaluation of other conditions and diseases performed by the clinician. Therapeutic approaches for cholesterol disorders and hypertension are described in ATP II (Adult Treatment Panel II) (Banks et al 2001) and the Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI) (NHLBI 2002). In overweight WLCBs, control of cardiovascular risk factors deserves the same emphasis as weight loss therapy. Reduction of risk factors will reduce the risk for CVD, whether or not weight loss efforts are successful.

Steps (designated by a box in figure 1a) of the Weight Management Therapy Algorithm.

1. **Weight Loss Candidate (WLC) Loss Candidate (WLC)**

The interaction between a health care practitioner (generally a physician, dietitian, nurse practitioner, or physician's assistant) and a WLC that provides the opportunity to assess a WLC's weight status and provide advice, counseling, or treatment.

2. **History of overweight or recorded BMI ≥ 25**

   Seek to determine whether the WLC has ever been overweight. A simple question such as 'Have you ever been overweight?" may accomplish this goal. Questions directed toward weight history, dietary habits, physical activities, and medications may provide useful information about the origins of obesity in particular WLCs.

3. **BMI measured in past 1 year**

   For those who have not been overweight, a 2-year interval is appropriate for the reassessment of BMI. Although this time span is not evidence-based, it is a reasonable compromise between the need to identify weight gain at an early stage and the need to limit the time, effort, and cost of repeated measurements.

4. **Determine weight, height, and waist circumference; estimate BMI** Weight must be measured so BMI can be calculated. Most charts are based on weights obtained with the WLC wearing undergarments and no shoes.

5. **BMI ≥ 25 OR waist circumference > 35 in (88 cm for women) or > 40 in (102 cm for men)** These cutoff values divide overweight from normal weight and are consistent with other national and international guidelines. The relationship between weight and mortality is J-shaped, and evidence suggests that the right side of the 'J" begins to rise at a BMI of 25. Waist circumference is incorporated as an 'or" factor because some WLCs with a BMI lower than 25 will have a disproportionate amount of abdominal fat, which increases their cardiovascular risk despite their low BMI. These abdominal circumference values are not necessary for WLCs with a BMI ≥ 35 kg/m□.

6. **Evaluate risk factors** Risk assessment for CVD and diabetes in a person with evident obesity will include special considerations for the medical history, physical

examination, and laboratory examination. Detection of existing CVD or end-organ damage presents the greatest urgency. Because the major risk of obesity is indirect (obesity brings forth or worsens hypertension, dyslipidemias, and type 2 diabetes; each of these leads to cardiovascular complications), the management of obesity should be implemented in the context of these other risk factors. Although there is no direct evidence that addressing risk factors increases weight loss, treating the risk factors through weight loss is a recommended strategy. A nutrition assessment will also help to assess the diet and physical activity habits of overweight WLCs.

7. **BMI ≥ 30 OR ([BMI 25 to 29.9 OR waist circumference > 35 in (88 cm) (women) or > 40 in (102 cm) (men)] AND ≥ 2 risk factors)**

   The panel recommends that all WLCs who meet these criteria should attempt to lose weight. However, it is important to ask the WLC whether or not he or she wants to lose weight. Those with a BMI between 25 and 29.9 kg/m^2 and who have one or no risk factors should work on maintaining their current weight rather than embark on a weight reduction program. The panel recognizes that the decision to lose weight must be made in the context of other risk factors (e.g., quitting smoking is more important than losing weight) and WLC preferences.

8. **Dietitian and WLC set goals.** The decision to lose weight must be made jointly between the clinician and WLC. WLC involvement and investment is crucial to success. The WLC may choose as a goal not to lose weight but rather to prevent further weight gain. As an initial goal for weight loss, the panel recommends the loss of 10 percent of baseline weight at a rate of ½ to 1 kg per week and the establishment of an energy deficit of 500 to 1,000 kcal/ day. For individuals who are overweight, a deficit of 300 to 500 kcal/day may be more appropriate, providing a weight loss of about ¼ to ½ kg per week. Also, for the current study there is evidence that an average of 11.96 percent of body weight can be lost over 18 weeks. Since this observed average weight loss includes people who do not lose weight, an individual goal of 11.97 percent is reasonable. After 36 weeks, most WLCs will equilibrate (caloric intake balancing energy expenditure); thus, they will require an adjustment of their energy balance if they are to lose more weight.

The three major components of weight loss therapy are dietary therapy, increased physical activity, and behaviour therapy. These lifestyle therapies should be attempted for at least 36 weeks before considering any other therapy. In addition, pharmacotherapy should be considered as an adjunct to lifestyle therapy for WLCs with a BMI 30 kg/m^2 and who have no concomitant obesity-related risk factors or diseases. The risk factors or diseases considered important enough to warrant pharmacotherapy at a BMI of 27 to 29.9 kg/m^2 are hypertension, dyslipidemia, CHD, type 2diabetes, and sleep apnea.

9. **Progress and goal accomplishment.** During the acute weight loss period and at the 18 weeks and 18 weeks follow up/maintenance visits, WLCs should be weighed, their BMI should be calculated, and their progress should be assessed. If at any time it appears that the program is failing, a reassessment should take place to determine the reasons. At the proposed the programme, the average duration of behavioural treatment was proven to be 36 weeks in total which this included 18 weeks weight loss with behaviour modification and 18 weeks for maintenance and behaviour modification. Average weight loss is to be 11.96 kg for weight loss period with an average of weight loss of 0.66kg per week. Overweight and moderately obese WLC could expect to lose 13.96% of their body weight and this is considered a good progress. The WLC can then enter the phase of weight maintenance and long-term monitoring. It is important for the practitioner to recognize that some persons are more apt to lose or gain weight on a given regimen; this phenomenon cannot always be attributed to the degree of compliance. However, if significant obesity persists and the obesity-associated risk factors remain, an effort should be made to reinstitute weight loss therapy to achieve further weight reduction. Once the limit of weight loss has been reached, the practitioner is responsible for long-term monitoring of risk factors and for encouraging the WLC to maintain the level of weight reduction.

10. **Evaluate reasons for unsuccessful weight loss.** If a WLC fails to achieve the recommended 10-percent reduction in body weight within 6 months or 1 year, a reevaluation is required. A critical question to consider is whether the WLC's level of motivation is high enough to continue clinical therapy. If motivation is high, revise goals and strategies. If motivation is not high, clinical therapy should be discontinued,

but the WLC should be encouraged to embark on efforts to lose weight or to avoid further weight gain. Even if weight loss therapy is stopped, risk factor management must be continued. Failure to achieve weight loss should prompt the practitioner to investigate the following: (1) energy intake (i.e., dietary recall including alcohol intake and daily intake logs),

(2) Energy expenditure (physical activity diary), (3) attendance at psychological/behavioural counseling sessions, (4) recent negative life events, (5) family and societal pressures, and (6) evidence of detrimental psychiatric problems (e.g., depression, binge eating disorder). If attempts to lose weight have failed, and the BMI is ≥ 40, or 35 to 39.9 with comorbidities or significant reduction in quality of life, surgical therapy should be considered.

11. **Maintenance counsel and follow up.** Evidence suggests that more than 80 percent of the individuals who lose weight will gradually regain it. WLCs who continue to use weight maintenance programs have a greater chance of keeping weight off. Maintenance includes continued contact with the health care practitioner for education, support, and medical supervision.

12. **Determine the desire of the WLC to lose weight.** WLCs who do not want to lose weight but who are overweight (BMI 25 to 29.9), without a high waist circumference and with one or no cardiovascular risk factors, should be counseled regarding the need to maintain their weight at or below its present level. WLCs who wish to lose weight should be guided according to. The justification of offering these overweight WLCs the option of maintaining (rather than losing) weight is that their health risk, although higher than that of persons with a BMI < 25, is only moderately increased.

13. **Recommend to retain weight/present other risk factors.** WLCs who have a history of overweight and who are now at an appropriate body weight, and those WLCs who are overweight but not obese and who wish to focus on maintenance of their current weight, should be provided with counseling and advice so their weight does not increase. An increase in weight increases their health risk and should be prevented. The clinician should actively promote prevention strategies, including enhanced attention to diet, physical activity, and behaviour therapy. For addressing other risk

factors; even if weight loss cannot be addressed, other risk factors should be treated.

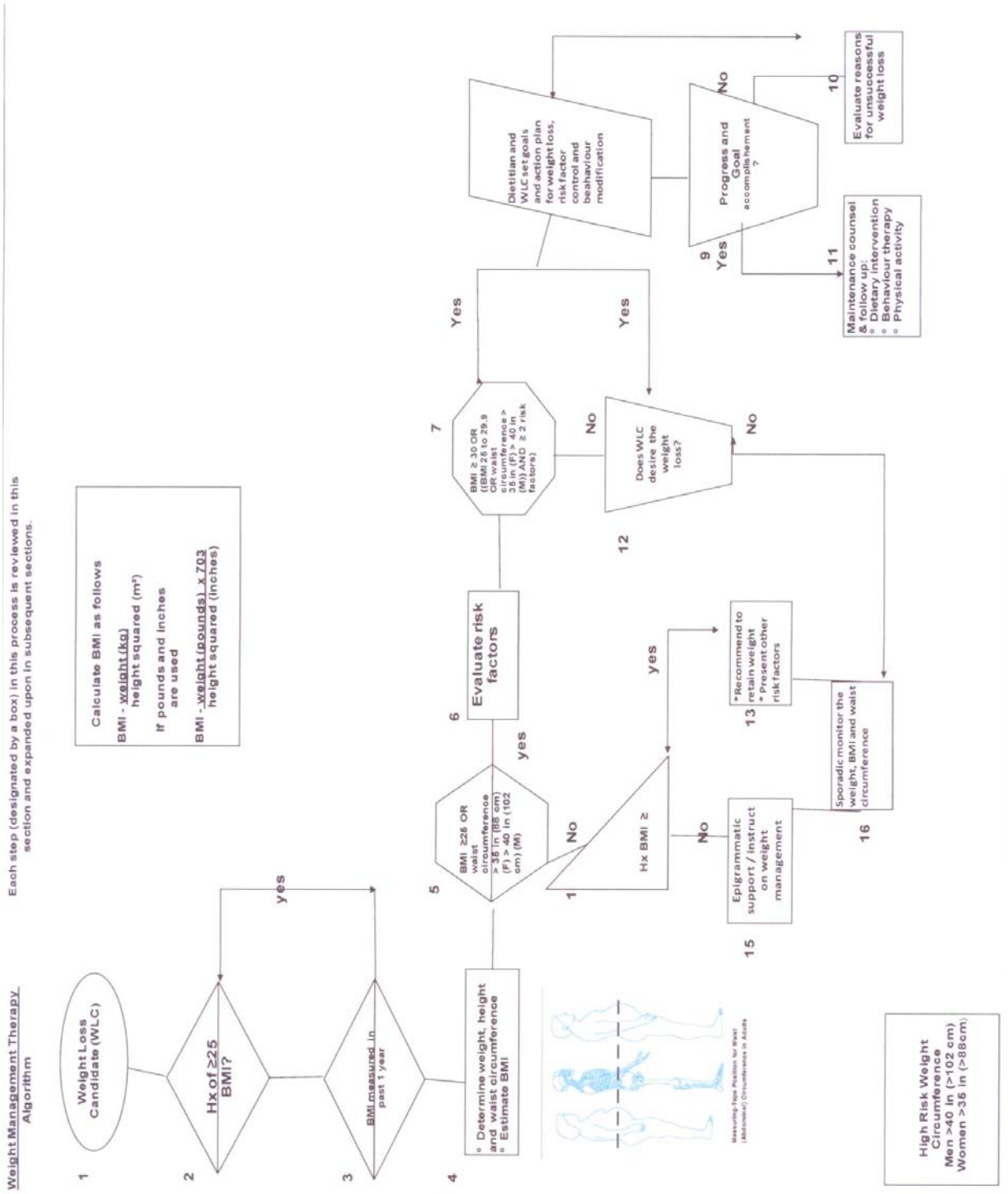
14. **History of BMI ≥ 25** this box differentiates those who presently are not overweight and never have been from those with a history of overweight.

15. **Epigrammatic support/ instruct on weight management.** Those who are not overweight and never have been should be advised of the importance of staying in this category.

16. **Sporadic monitoring the weight, BMI, and waist circumference.** WLCs should receive periodic monitoring of their weight, BMI, and waist circumference. WLCs that are not overweight or have no history of overweight should be screened for weight gain every 1 year. This time span is a reasonable compromise between the need to identify weight gain at an early stage and the need to limit the time, effort, and cost of frequent measurements.

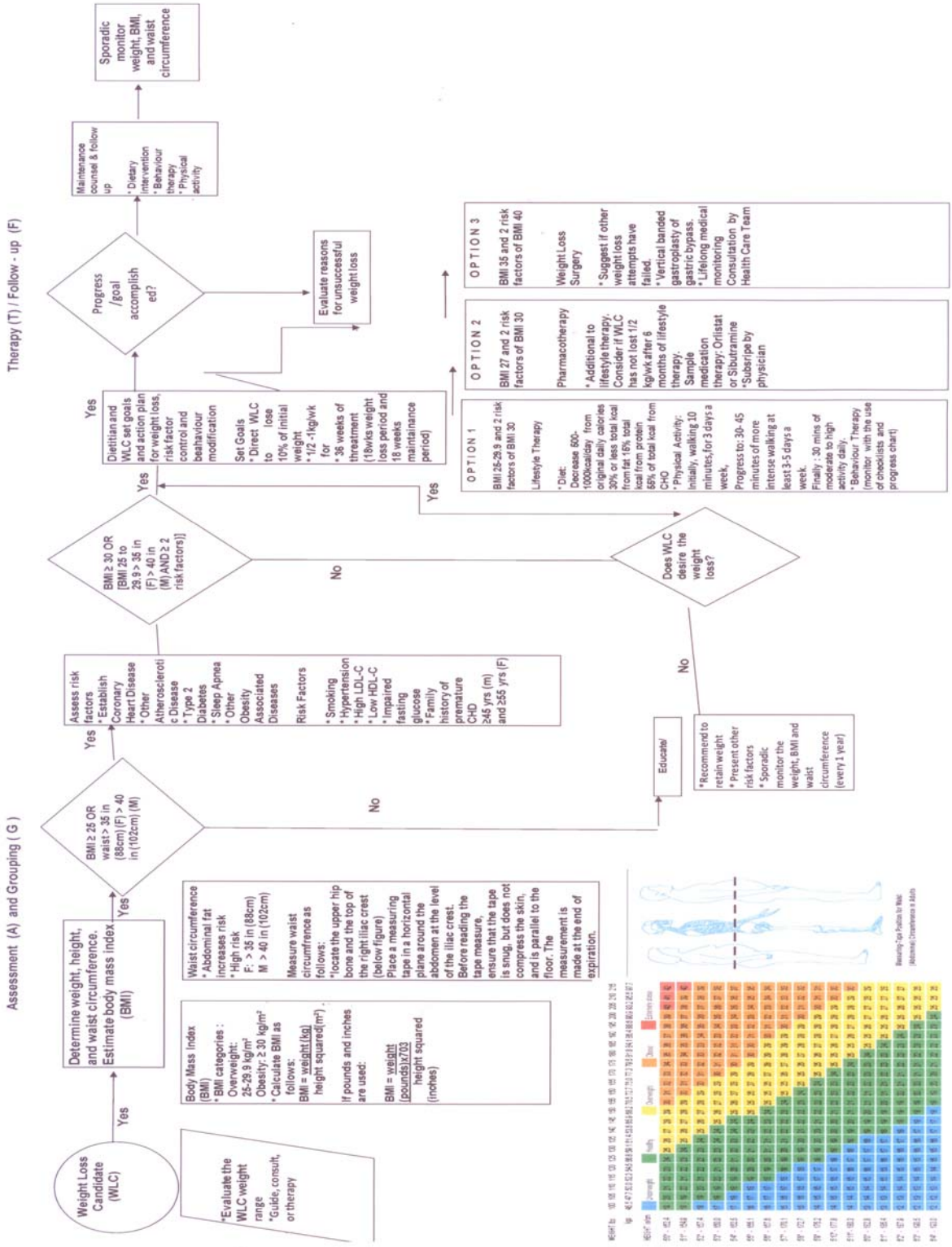
For the therapy of obesity, a tool call AGTF was developed for the purposes of this study. The A represented the Assessment (A) of the anthropometric status based on the BMI and waist circumference.of the WLC. The G represented the Grouping (G) of the WLCs according to their risk factor of obesity and their willingness for weight loss to determine the suitable Therapy (T) for them and present and reinforce the importance of the Follow-up of WLC (F). These steps are presented in figure 1 (b) AGTF tool for the Nutrition. Intervention and Behaviour Modification of the WLCs.

FIGURE 1 (a). Therapy algorithm for obesity



Source: National Institutes of Health 2000

FIGURE 1 (b). AGTF tool for Nutrition Intervention of WLC



Recommendations for Adult Weight Loss Therapy

Goals

Initially, attempt to reduce body weight by approximately 13.96 percent from baseline. With success, attempt further weight loss, if indicated, through further assessment.

Reduce weight at a rate of about 05 to 1 kg per week with an average of 0.66kg per week for 18 weeks and then candidates maintained of their initial weight loss 18 weeks after treatment termination with a total treatment period of 36 weeks compared to the control candidates who followed diet only.

Base subsequent strategies on the amount of weight lost.

Dietary therapy

Encourage calorie reduced diets for overweight and obese adults sufficient to their needs and at level which it will be lower for 500kcal of the Total Daily Expenditure.

As part of a low-calorie diet, fat reduction is a practical way to reduce calories.

Reducing dietary fat alone without reducing total calories is not sufficient for weight loss.

Reducing dietary fat along with dietary carbohydrates facilitates caloric reduction.

Reducing dietary fat along with increasing calcium will promoter higher percentage of weight loss.

The diet should be high in fiber, moderate in salt with portion control and well distributed meals throughout the day.

The WLC candidates should adapt breakfast as an ongoing nutritional habit and follow the food plate model while dinning out.

An individually planned diet creating a deficit of 500 to 1,000 kcal per day should be an integral part of any program aimed at achieving a weight loss of ½ -1kg per week. (See Table 3 for recommended daily energy allowances for adults.)

Table 3. Recommended Average Daily Energy Allowances for Children and Adults*

Population group	Age (years)	Kcal per kg	Kcal per day
Children	1 to 3	102	1,300
	4 to 6	90	1,800
	7 to 10	70	2,000
Men	11 to 14	55	2,500
	15 to 18	45	3,000
	19 to 24	40	2,900
	25 to 50	37	2,900
	51+	30	2,300
Women (non-pregnant, non-lactating)	11 to 14	47	2,200
	15 to 18	40	2,200
	19 to 24	38	2,200
	25 to 50	36	2,200
	51+	30	1,900

*—For reference populations, engaged in light to moderate physical activity, with no underlying medical condition.

Source: National Research Council 1989.

Physical activity

Exercise contributes modestly to weight loss in overweight and obese adults.

Physical activity may decrease abdominal fat.

Physical activity increases cardiorespiratory fitness.

Physical activity may help maintain weight loss.

Physical activity should be an integral part of weight loss therapy and weight maintenance.

Initially, encourage moderate levels of activity for 30 to 40 minutes per day, three to five days per week.

Set a long-term goal to accumulate at least 30 minutes or more of moderate-intensity physical activity on most, preferably all, days of the week. (See table 4 for examples of moderate amounts of physical activity).

Table 4.

Examples of Moderate Amounts of Physical Activity*		
Common Chores	**Sporting Activities**	
Washing and waxing a car for 45–60 minutes	Playing volleyball for 45–60 minutes	Less Vigorous, More Time†
Washing windows or floors for 45–60 minutes	Playing touch football for 45 minutes	
Gardening for 30–45 minutes	Walking 1¾ miles in 35 minutes (20 min/mile)	
Wheeling self in wheelchair for 30–40 minutes	Basketball (shooting baskets) for 30 minutes	
Pushing a stroller 1½ miles in 30 minutes	Bicycling 5 miles in 30 minutes	
Raking leaves for 30 minutes	Dancing fast (social) for 30 minutes	
Walking 2 miles in 30 minutes (15 min/mile)	Water aerobics for 30 minutes	
Shoveling snow for 15 minutes	Swimming laps for 20 minutes	
Stairwalking for 15 minutes	Basketball (playing a game) for 15–20 minutes	
	Jumping rope for 15 minutes	More Vigorous, Less Time
	Running 1½ miles in 15 minutes (15 min/mile)	

* A moderate amount of physical activity is roughly equivalent to physical activity that uses approximately 150 calories of energy per day, or 1,000 calories per week.

† Some activities can be performed at various intensities; the suggested durations correspond to expected intensity of effort.

Source: National Institutes of Health 1998

Behaviour therapy and Behaviour Modification

Behaviour therapy is a useful adjunct to diet and physical activity.

Assess patient motivation and readiness to implement the weight management plan and take steps to motivate patient for treatment.

Behaviour strategies to promote diet and exercise should be used routinely, as they are helpful in achieving weight loss and maintenance.

Stimulus Control-cues

Developing Healthy Eating Habits

- Do not go on a diet but change the way you eat on a permanent basis
- Stimulus narrowing: eat only in specified places and nowhere else
- Eat small meals often rather than 2 or 3 big ones
- Eat only when you are hungry: stop and think before you eat
- Proceed slowly, expecting to lose no more than 6 to 8 pounds per month
- Keep a journal of everything eaten, including what, how much, when, where, and how you felt

Grocery Shopping

- Make a list of needed items before you go
- Do not take checks, ATM, or credit cards
- Take just the amount of cash you feel will be needed to pay for the items on the list
- Do not grocery shop when you are hungry
- Avoid aisles with snack and junk food that you do not need

What to Do With Food at Home

- Once food is in the house, put it away, preferably out of sight
- The more difficult it is to get to or prepare, the less likely it will be eaten
- Keep a journal of everything eaten, including what, how much, when, where, and how you felt

- Eat only in one place and not while engaged in any other activity
- When anything is eaten, put out a full place setting and then clean it up

Preparing and Eating Meals

- Prepare only as much food as will be necessary for the meal
- Do not overly sample while preparing
- Serve portions onto plates; do not place bowls or pans of food on the table
- Any leftover food should be put away or discarded before sitting down to eat
- Eat slowly
- Stimulus narrowing: eat only in specified places and nowhere else
- Eat small meals often rather than 2 or 3 big ones
- Eat only when you are hungry; stop and think before you eat: "Do I really need this food?"
- Stop eating when you are full
- Do not totally deprive yourself of any favorite food but allow small amounts of it once in a while

At Other Times

- Be as active as possible; set up regular exercise
- Have a support group, perhaps friends with similar problems, you can talk to during times of temptation
- Get your family and close friends to support your efforts
- Do not weigh often, only about once a week, as weight loss will be slow and uneven
- Expect occasional setbacks; don't be discouraged; just get back on track as soon as possible

Combined therapy

Weight loss and weight maintenance therapy should involve a combination of reduced-

calorie diets, individualized to the needs of each WLC, increased physical activity and behaviour therapy. The combination of a reduced-calorie diet and increased physical activity has been shown to:

Produce weight loss

Decrease abdominal fat

Increase cardiorespiratory fitness

As a primary goal, interventions should focus on achieving healthy eating and physical activity habits rather than attainment of an ideal body weight. After completing an initial weight management program, candidate must continue to work to maintain a desired weight. Successful treatment requires long-term follow-up, with frequent dietitian's visits, continual monitoring and reinforcement. Throughout these encounters, dietitians must stay aware, considerate and accommodating of the candidate and family to foster necessary improvements and lifestyle changes.

Dietitian's Role

Considering the public health implications of obesity, it is essential that dietitians increase their knowledge of obesity and related comorbidities and recognize it as a complex disorder that requires long-term follow-up and care. To provide scientifically sound advice about weight loss or weight maintenance to their WLC, dietitians are encouraged to improve their understanding of the nature of obesity, the difficulty of treating this condition and the importance of counseling WLC about realistic goals for weight reduction.

The dietitians must be responsible to assess their WLC for overweight and that WLC receive appropriate counseling about safe weight management and the benefits of physical activity and a healthy diet. If treatment is indicated, dietitians can help WLC develop weight loss or management plans tailored to individual needs; this includes setting reasonable weight loss goals; selecting appropriate weight loss programs; referring WLC to additional personnel when appropriate; and providing monitoring, support and encouragement. In determining the appropriateness of any weight loss program, it is essential for dietitians and WLC to realize that the goal of treatment is not necessarily weight loss alone, but weight management to achieve the best possible weight

for improved health. The dietitian dealing with obesity and overeweight needs to be able to understand and apply Cognitive-Behaviour Therapy (ie. ABC method). This type of therapy works on the premise that thinking, questioning and doing (with practice) leads to the changes needed for recovery. Learning to change the way you think about yourself will result in changing the way treat the self. There is an eclectic combination of cognitive, behavioural and emotional techniques: changing negative thoughts to positive and pessimistic words to optimistic words. Using humor, role playing, and homework and word-work in attacking shameful feelings and feelings of guilt are combined with the effort to make changes in thinking and behaviours. The focus with cognitive-behaviour therapy is that it is a "move-forward" approach and often lacks exploration of the deeper emotional issues that led to negative behaviours and thoughts in the first place. There can also be Behaviour Modification Therapy on its own where as the client focuses on changing behaviours through practice.

Directions for Dietitians for Professional Development regarding dealing with Weight Management

- Encourage dietitians, as well as managed care organizations and other third-party payers, to recognize obesity as a complex disorder concerning appetite regulation and energy metabolism that is related with a diversity of comorbid situations.
- Work with proper agencies, medical area of expertise and community health organizations to alert dietitians and other health professionals about the prevention and management of overweight and obesity, including education in basic principle and practices of physical activity and nutrition counseling; such training should be included in undergraduate and graduate medical and health education and through qualified continuing medical education programs.
- Urge support of study to conclude: (1) the causes and mechanisms of overweight and obesity, including biologic, social and epidemiologic influences on weight gain, weight loss and weight maintenance; (2) the long-term security and effectiveness of controlled weight maintenance and weight loss practices and

therapies, (3) valuable interventions to avoid obesity in children and adults; and (4) the usefulness of weight loss counseling by dietitians.

- Encourages public efforts to educate the community about the health risks of being overweight and obese, and offer information about how to accomplish and maintain a healthy weight.
- The need for dietitians to assess their WLC for overweight and obesity during routine medical examinations and talk about with at-risk WLC the health consequences of additional weight gain; if treatment is indicated, dietitians should persuade and assist weight maintenance or reduction efforts in their WLC with cooperation of a specialized physician in the clinical management of obesity,.
- Encourage all dietitians and WLC to maintain a desired weight and prevent unfortunate weight gain.
- Dietitians should become well-informed about the public resources and referral services that can help with the management of overweight and obese WLC.

Weight Loss: Behaviour Modification Techniques for Eating Behaviour

The following were developed and given to the participants of the WLBMP as techniques for the modification of their eating behaviour. They are presented in the way their given to the participants.

1. Increase water intake. Give yourself a goal of 1 gallon per day. This aids in the feeling of being "full", as well as cleaning out your system. If you feel you're unable to start drinking large quantities right away, just be sure to start drinking more than you are now.

2. Never skip breakfast. Whether your food plan allows you cereal and toast or fruit and yogurt, make an effort to sit down at the table and consciously enjoy your breakfast.

3. Eat all of your meals and snacks at the same designated eating space and preferably the same time of day.

4. Before eating, record all food intakes. Note what is going on your plate before it goes in your mouth. You are less likely to misjudge your servings if you have them measured and written down first.

5. Eat your favorite foods first.

6. Know you're most vulnerable times for snacking and plan a defense before temptation strikes. Go for a walk, exercise; phone a friend or a diet buddy.

7. Get rid of clothes you no longer fit into. This keeps you from falling back into a "comfort zone", as you will immediately notice your new clothes feeling snug.

8. Give yourself a non-food reward for all of your accomplishments. Don't save your rewards just for reaching major goals, but reward yourself every time you pass up a cinnamon bun or walk right on by the vending machine. Take the money you would have spent on the candy bar and put it in a special "rewards" jar. As it adds up, get yourself special treats like a new bubble bath or cologne. Anything that makes you feels special.

9. Put your meals on smaller plates or in shallow bowls. If your food plan is rigid with portion sizes, this will especially make you feel as if you're eating more.

10. If you can't have it, don't have it around. In a perfect world this would be a simple thing, but for those of us with families to care for we often must encounter what we can't partake of.

    The answer to that is if you can't keep it out of the house, keep it under wraps. Put tempting foods in colored or paper bags and store them in the back of the cupboard. When preparing meals try to make only enough for others but none for you, if it's something you can't have. During meal times, keep serving dishes off the table and dispose of leftovers immediately.

PHYSICAL ACTIVITY PRESCRIPTION

*S*uccessful models in adult physical activity counseling have incorporated concepts from stages of change theory, social cognitive theory, and behaviour modification techniques. These include identifying the patient's readiness to make a behavioural change, goal setting, creating contracts, addressing barriers, and enlisting social support. These concepts can be incorporated into clinical counseling interventions and can be adapted to a variety of health behaviours.

The key point is that a physical activity prescription is needed only for those WLC who are ready to make a change. Young people and adults who meet the recommended levels of activity should receive brief reinforcement about their healthy lifestyle and encouragement about continuing their activity. This approach is more satisfying for WLC and health professionals, is a much better use of valuable counseling minutes, and allows professionals to spend the most time with WLC who are ready to make positive changes.

For inactive adults who are not ready to change, identifying potential benefits and current barriers to activity can be an important first step. Often physical activity can be recommended for a medical reason, such as an increase in weight disproportionate to an

increase in height, borderline blood pressure for age, or a strong family history of cardiovascular disease and/or diabetes. Focusing on the potentials of short and long-term benefits of physical activity, emphasizing benefits can be a very effective motivation.

Common patient barriers to physical activity include lack of time, lack of access to facilities, unsafe neighborhoods, and dislike of exercise. For this group, identifying benefits and addressing the barriers can be the first step toward getting the individual or family to think about becoming more physically active.

Presenting recommendations as a "physical activity prescription" is a useful concept (CDC 2001). Writing a patient a prescription uses a medical model with which both health professionals and WLC are familiar. It also reinforces the notion to WLC that physical activity is as important to their health as any medication that might be prescribed. Allowing the patient to participate in setting the physical activity goal will enhance compliance with the prescription. Adapting simple behavioural change concepts into counseling will help make the limited time available for counseling more effective.

For inactive or irregularly active adults who are interested in increasing their activity level, counseling should include an actual activity plan or physical activity prescription. Because these WLC are ready to change, any counseling or direction provided is much more likely to translate into a behaviour change. Focus should be placed on increasing moderate physical activity to between 30 and 60 minutes per day. This can be accomplished by accumulating several bouts of 10 to 15 minutes of activity. It is important to have the person/patient be as clear as possible regarding the plan, including type of activity and intensity, location, when he or she is going to be active, and the duration. In order to make the plan detailed, the person/adult will need to anticipate barriers and create solutions. The more detailed the plan, the more likely the person/adult is to meet his or her goal.

CREATING A SOCIAL CLIMATE FOR PHYSICAL ACTIVITY

Physical activity needs to be fun and accessible for the individual if it is to be continued. It is important to help adult/patient choose an activity routine that is fun, developmentally appropriate, and realistic given his or her individual, family, and community resources. One method used frequently in exercise prescription for adults incorporates the following: frequency, intensity, time (duration), and type of activity. This can be useful for creating a physical activity prescription, and it can be used as a simple way to document recommendations in the medical record.

Suggestions for increasing physical activity can include walking or bicycling for transportation and planning physically active rather than sedentary activities with friends.

Identifying ways to incorporate increased physical activity into the activities of daily living can also be useful. Examples include taking the stairs whenever possible, getting off the bus a stop earlier, taking walks with friends rather than talking on the telephone, and walking at least one lap of the mall before shopping.

Identifying a social support or physical activity partner has been identified as an important component in making a successful behaviour change. Adults should plan active times or vacations with their family and friends.

SUPPORT

The behaviour of an adult/patient who is appropriately active should be reinforced. Often it is helpful to identify the health benefits of regular activity, such as maintenance of appropriate weight, increased energy, improved sense of well-being, and self-esteem. It can also be useful to assess how confident a patient is that he or she will remain active and to provide solutions for any identified potential barriers to maintaining that activity.

Health care providers such as dietitians need to be good role models for their WLC and their families. This includes a personal plan for incorporating physical activity within

their own busy schedules. Studies with internists show that dietitians who are regular exercisers are more likely to provide more frequent and more aggressive physical activity counseling for their WLC.

COMMUNITY/ SCHOOLS

Dietitians can play an important role in promoting physical activity by being good role models for an active lifestyle and being advocates for physical activity in other arenas. Children and adolescents spend most of their time attending school. Dietitians need to advocate for more health education and physical education that includes aerobic lifestyle activities (ie, walking, jogging, dancing), as well as teaching sport-specific skills. In addition, dietitians can become more involved with teachers and coaching staff. This communication improves the care of the young athlete and increases the effectiveness of dietitians, teachers, and coaching staff.

Health care providers and dietitians are also important advocates for the availability of safe and accessible places for physical activity to occur within the community. This advocacy ranges from promoting the availability of open spaces, parks, recreation centers, and community centers to promoting the availability of schools and school playgrounds after hours.

See appendix I (Behaviour Modification Guidelines for Eating and Exercise)

CONCLUSIONS

To conclude, the prevalence of obesity worldwide has reached epidemic proportions. Physical inactivity and poor diet have been identified as primary contributors to the leading causes of death in developed countries including Cyprus. It is unfortunate that more emphasis is given to calorie restriction dieting rather than behavioural modification for diet and physical activity in achieving and maintaining weight loss. The fact is that incorporating appropriate behavioural modification techniques for diet and sufficient physical activity into one's life is an essential component of achieving a healthy body weight. In this study better results achieved by the intervention group (Behavioural modification – eating habits and exercise) than the control group (diet only).

Behavioural approaches are used to help WLC make long-term changes in their eating and exercise behaviours. To accomplish this, behavioural approaches stress monitoring of dietary intake and physical activity and modifying the cues and reinforcers in the environment.

The research project aimed at developing a behavioural approach and behavioural modification techniques for the treatment of obesity and weight management adjusted to the needs of the Cypriot adult population. The difference of this approach underlined the emphasis that has been given to the follow-up programme for the maintenance of the weight loss through behavioural modification. This approach evolved from the environmental control of eating behaviour to a broader approach characterized by systematic manipulation of all factors associated with eating and exercise patterns.

The fact that obesity is a chronic condition with a substantial potential for relapse; therefore long–term treatments (more than 2 years maintenance) are needed can be considered as limitation.

Outcomes

The expected outcomes of this project were the development of guidelines and protocols to be used by health professionals and the public in Cyprus.

The protocol was designed based on international guidelines for weight management, nutrition and health. The references are presented in the bibliography section of the protocol.

The criteria that were used for the assessment and the categorization of the treatment of overweight and obesity were internationally based (i.e. BMI, WC, BF). The differentiation of the protocol and Guidelines prepared as outcome for this DProf study and the international guidelines are partially on the therapy and follow up of the overweight and obese people. Examples for the purpose of our project are the eating habits and the barriers to exercise in Cyprus.
Furthermore the development of guidelines were tailored towards the Cypriot population.
The following guidelines are referred as appendix in the manual/protocol:
Appendix
B. Shopping- Food Labeling- Traffic Lights Appendix
C. Nutrient and Calorie Modifications Appendix
D. Food Exchange List
E. Menus with Lower Calories Appendix
F. Cooking Can be Healthy and Tasty Appendix
G. Dinning Out— Use of the Food Plate Model. Appendix
H. The Physical Activity Guidelines Appendix
I. Behaviour Modification Guidelines For Eating and Exercise Appendix
J. Goal Setting and Recording for Weight Management Appendix
K. Food and Physical Activity Diary

The development of guidelines and protocol is for the health professionals for Weight Management. The same protocol includes easy reading and following guidelines for the stakeholders and the WLC. Straight forward recommendations and suggestions to stakeholders for the use of Protocol and Guidelines are as followed:
1. Cyprus Dietetic and Nutrition Association to use it towards the implementation of its goal oriented Strategic Plan regarding the weight management.

2. Cyprus Registration Board for Food Scientists and Dietitians to use it in conjunction to the goals set by the European Federation of Associations for Dietitians.
3. The Ministry of Education and Culture to use it towards the education of the Health related educators and parents.

The benefits of the Protocol and Guidelines are the recommendations to dietetic/ nutrition professionals, educators, parents, clientele regarding weight management, the Policy and program development in the educational and health community, the prevention and intervention based on theory and research findings and the practical value for consumers.

It was concluded from this study that most of participants reacting positively to the behaviour modification were well educated people the participants (university graduates).

As far as concern the dietary habits prior to the study, the initial dietary log provided evidence that the respondents did not follow a dietary menu based on the DRI or to nutritional guidelines, which that could have also contributed to their obesity. One aim of the experiment was to change the eating habits of the respondents so that they would be able to maintain healthy eating habits and also have adequate intakes of the required vitamins, minerals, macronutrients and energy. This should help them manage their weight problems and also help them to combat disease and sickness to which they are vulnerable, like heart disease~~s~~, diabetes and cancer.

As far as concern the anthropometric measurements during the weeks 1-18, there was a considerable weight loss (mean= 11.96kg), however due to individuality not everyone managed to achieve the Ideal Body Weight (IBW) during the 18 weeks of the weight loss. The same applies for the other anthropometric parameters (%BF, %LBM, %TBW, WC, BMI). Among healthy men, all anthropometric measurements are approximately normally distributed and cover a broad range of values
During the maintenance period (19-36 weeks), the intervention group was not expected to change any of the anthropometric measurements (↓body weight, ↓ WC, ↓BF, ↑LBM, ↑TBW, ↓BMR, ↓BMI). However, a small difference (↓body weight (1.27kg), ↓ WC,

↓BF, ↑LBM, ↑TBW, ↓BMR, ↓BMI) was observed in all of them. This was true, in the cases of the people who did not reach the Ideal Body Weight during the weight loss period (1-18weeks) because of the high weight they had initially. The intervention group participants with the behaviour modification appeared to be self motivated to continue their weight loss behaviour even during the maintenance period.

Differences in Weight, Body Fat (BF), Lean Body Mass (LBM), Body Fluids (TBW), Basal Metabolic Rate (BMR) and WC

In order to determine whether the weight loss period and weight maintenance period was successful the differences in the weights, body fat, lean body mass, body fluids, basal metabolic rate and WC of the participants in both control and treatment groups were analyzed using the t-test statistical indicator. A significant difference would show that the weight loss program was a success since the weight differences are significant.

Intervention Group-Behaviour Modification

For the treatment group, there is enough statistical evidence to say that there is a significant difference in the weight, body fat, lean body mass, body fluids, basal metabolic rate, body mass index and WC of the respondents over the period of treatment. The debate on whether they attained their ideal body weight is not the principal concern in this particular study. What is important is whether they were able to decrease their body weight through the weight loss program implemented in this study. With a mean difference of 11.96 Kg, it can be said that the participants were able to lose a significant amount of weight from week 1 to week 18 as evidenced by the p-value of 0.00. This is also true with the rest of the indicators such as body fat, lean body mass, body fluids, basal metabolic rate, body mass index and WC (see appendix).

The intervention group was treated with behaviour modification methods since the study hypothesized that this treatment added to diet and exercise will enable the participants to maintain on average about at least two thirds of their initial weight loss.

For the weight maintenance period which is from week 19 to week 36, the same measurements were also taken to determine whether there were changes in the body weight of the participants. In all cases, there were small decreases in body weight, body fat, lean body mass, body fluids, basal metabolic rate, body mass index and WC but these changes were not significant as evidenced by the p-value of the t-test statistic employed. This means that there were no significant changes in the body weight of the participants and that they were able to maintain all the weight loss that they have attained.

Control Group

The weight, body fat, lean body mass, body fluids, basal metabolic rate, body mass index and WC of the participants assigned to the control group were also measured at the end of the weight loss period and by the end of the weight maintenance period. Similar observations were made for the control group in that there were some changes in weight, body fat, lean body mass, body fluids, basal metabolic rate, body mass index and WC. The control group was placed on diet only and was not exposed to behavioural modification process. The participants in the control group were able to maintain less weight during the weight maintenance period and were still able to lose weight but comparing to the mean weight of the participants in the treatment group by week 36 and it can be seen that the participants in the intervention group were able to lose more weight than those in the control group. This being so, it can be said that the behaviour modification techniques have probably played a part in the further weight loss of the participants in the treatment group.

REFLECTION ON BEHAVIOURAL TREATMENT PROGRAMME

The content of this behavioural therapy programme has turned into consistent for the purpose of our research. Group sessions typically included an individual, private weigh-in, review of self-monitoring records, and then a presentation of the lesson for the month. The group sessions were once every month. Participants (indentified in the protocol as WLCB- Weight loss Candidate with Behavioural Modification) were given specific coursework to complete over the following month, which are then reviewed at the following lesson. Table 1 and 2 and its analysis identified some of the topics typically addressed in our behavioural program.

Behaviour modification is critiqued in person-centered psychotherapeutic approaches. The argument is that these methods involve connecting with the human qualities of the person to promote healing and that behaviourism is denigrating to the human spirit. Skinner (1974) argued against this position in Beyond Freedom and Dignity by arguing that unrestricted reinforcement is what led to the "feeling of freedom" and thus removal of aversive events would allow people to "feel freer". Further reflection extends to the presumption that behaviour increases only when it is reinforced. There was evidence in our study that imitation is a series of behaviour that can be learned just like anything else. There is a reflection on the level of training required to perform behaviour modification procedures. Level of training and consumer protection should be of critical importance in applied behaviour analysis and behaviour modification.

In reflection to our study there are several characteristics to behaviour modification regarding eating habits and exercise. They are:

- There is a strong emphasis on defining problems in terms of behaviour that can be measured in some way.
- The treatment techniques are ways of altering an individual's current environment to help that individual function more fully.
- The methods and rationales can be described precisely.
- The techniques are often applied in everyday life.

- The techniques are based largely on principles of learning - specifically operant conditioning and respondent conditioning
- There is a strong emphasis on scientific demonstration that a particular technique was responsible for a particular behaviour change.
- There is a strong emphasis on accountability for everyone involved in a behaviour modification program.

It was very enlightened to realize that Martin and Pear (2007) determined those traits of behaviour modification in their studies.

Therapy and consultation cannot be effective unless the behaviours to be changed are understood within a specific context. The process of understanding behaviour in context is called functional behavioural assessment (Roberts 2001). Therefore, a functional behavioural assessment is needed before performing behaviour modification. One of the simplest yet effective methods of functional behavioural assessment is called the "ABC" approach, where observations are made on **Antecedents, Behaviours, and Consequences.** The ABC method, which is part of Cognitive Behaviour, was used to promote the anticipated behaviour modification with the WLC examined. Although, in table 2 were presented examples of this method reflecting to our study, here we conclude with further examples of changes in thinking that can contribute to successful weight loss that we use in reflection to our hypothesis and based to this method:

Change fundamental ideas about hunger. People who have never struggled with losing weight usually have quite different ideas about hunger than do those who struggle with it. The former tend to think of hunger as normal, tolerable, and that even when you sense it, you should wait until your next meal to eat. The latter are apt to think of hunger as bad, intolerable, and in need of instant fixing. The solution of offer to that was emphasize the small the frequent meals, standard hours of meal times, drinking a lot of water between means, and the use of “free foods” (foods that are low in energy and can be eaten in high amounts) in order to prevent hunger. Develop a nutritional eating plan and then identify those thoughts that are likely to get in the way of implementing it. In other words, they

need to counter ideas that lead to overeating such as “dieting is too hard” or “it's not fair that I have to diet.”

Write down the reasons they want to lose weight and read the list every day, not just at a regular time, but at times when they are hungry or craving food. People fighting obesity have to remind themselves over and over again why their goal is so important.

Remember in moments of temptation to say, “Okay, I have a choice. I can eat this food that I hadn't planned to eat and get momentary pleasure and then feel badly afterwards, or I can remind myself of all the reasons why I want to lose weight and feel very good about myself” or even ask oneself “ Do I really want to it now, do I really want to eat ?”.

Learn how to say no to food pushers—family members and friends who enable overeating. Further to say no means changing thinking patterns. It means stop worrying about disappointing other people and convinces you that losing weight is a legitimate, important goal and that the WLC is entitled to stick up him/herself as long as he/she does in an appropriate way in order to control the overeating.

Our approach managed to help WLC replace self-defeating thoughts and behaviours with more constructive ideas and beliefs, so they can achieve their weight loss goals and build self-confidence. The tools and approaches used (see table) for the best results of weight loss are summarized to the following: Focus on Lifestyle Change, Self-Monitoring Diet and Exercise Log/Diary, Positive Reinforcement, Building Self-Esteem, Peer/Family Support and Aftercare and Socializing. The ways of giving positive reinforcement in behaviour modification for this study were by providing compliments, approval, encouragement, and affirmation as well as offering small tokens.

Strengths and potential limitations of the study

Behavioural treatment resulted in a realistic weight loss for most WLCB while two aspects of treatment were greatly emphasized. WLCB needed to be motivated to change their behaviours to improve health rather than to achieve a particular weight to satisfy their self-importance (this is something that was achieved throughout the study).

Weight losses in the range achieved by behavioural methods can produce significant improvements in health and can reduce risk factors for disease (the investigation and verification factor is something that is needed to be examined in the future as a continuation of this study).

A major strength is that the sample was from our clientele and rapport between sample and investigator has been already established. They were people who already decided to visit a dietitian and they decided to follow a nutritional plan and/or exercise programme. As results shows, during the 18 weeks of the maintenance period the 50% of the intervention group continued to lose while, an additional 48% of them maintained the weight and only 2% of them gained weight. Furthermore, other strengths were that thhe sample voluntarily participated with a low possibility of withdraw, the personal benefits were at no cost, different research methods for more accurate results were used and the development /modification and the use of the checklists was initiated and applied for the best results of behaviour modification.

The problem in the management of obesity is the high attrition rates (ADA 2005). On the other hand, in the current study the sample voluntarily participated and thus the possibility of giving up the nutritional plan and exercise schedule was limited. Furthermore, the participants had personal benefits such as weight management, nutritional assessment and behavioural modification at no cost.

Another limitations for the investigators was that the whole process of counseling (behaviour modification) was considered time-consuming but very effective in the weight management results. In our study supervision was very intense as the consensus of opinion suggests (NHLBI 2010). Obesity is to be treated as a chronic disease therefore; a long-term commitment is required on the part of both the client and health professionals to improve retention in weight management programmes. Furthermore, methods that identify those likely to remain in or drop out of programmes may improve retention rates (ibid).

Furthermore, it can be considered a limitation of the study and something that is going to be studied in the future the link of the biological markers (eg lipid profile , glucose, CRP, insulin resistance) with use of the biohavioural modification model. The behavioural modification can be used in order to prove its effect to the health problem groups (i.e, diabetic heart patients, eating disorder patients).

Measuring physical activity has proved to be a challenging effort due, in part, to the multi-faceted nature of movement, as well as the limitations of self report. Both the objective measurements of the different dimensions of motion (type, duration, intensity) and the subjective reporting of activity are prone to error (Williams et al 2000). In an attempt to improve the accuracy of physical activity measurements investigators often combined two or more methods. Thus the limitation of one method was compensated by the strengths of another method.

Understanding the strengths and limitations of food records, dietary recalls, and food frequency questionnaires was important for the selection of methods, the development of strategies to minimize problems, and the appropriate interpretation of the data. To counteract this limitation, the development and the use of the checklists was initiated and applied.

This study was aimed to have as outcome the development of guidelines and protocol for the health professionals for Weight Management. The same protocol includes easy reading and following guidelines for the stakeholders and the WLC. Straight forward recommendations and suggestions to stakeholders for the use of Protocol and Guidelines are as followed:

1. Cyprus Dietetic and Nutrition Association to use it towards the implementation of its goal oriented Strategic Plan regarding the weight management.
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The benefits of the Protocol and Guidelines are the recommendations to dietetic/ nutrition professionals, educators, parents, clientele regarding weight management, the Policy and program development in the educational and health community, the prevention and intervention based on theory and research findings and the practical value for consumers.

GLOSSARY & ACRONYMS

Action research - A type of research in which educators examine their own practice and evaluate strategies to improve practice and education outcomes. Most action research studies use descriptive research designs.

Age-Adusted Body Fat Percentage Recommendations

Women

Age	Underfat	Healthy Range	Overweight	Obese
20-40 yrs	Under 21%	21-33%	33-39%	Over 39%
41-60 yrs	Under 23%	23-35%	35-40%	Over 40%
61-79 yrs	Under 24%	24-36%	36-42%	Over 42%

Men

Age	Underfat	Healthy Range	Overweight	Obese
20-40 yrs	Under 8%	8-19%	19-25%	Over 25%
41-60 yrs	Under 11%	11-22%	22-27%	Over 27%
61-79 yrs	Under 13%	13-25%	25-30%	Over 30%

ANOVA - is a general technique that can be used to test the hypothesis that the means among two or more groups are equal, under the assumption that the sampled populations are normally distributed.

In general statistical usage, **correlation** or **co-relation** can refer to any departure of two or more random variables from independence, but most commonly refers to a more specialized type of relationship between **mean values.**

There are several **correlation coefficients, often denoted ρ or r,** measuring the degree of correlation. The most common of these is the **Pearson correlation coefficient**, which is mainly sensitive to a linear relationship between two variables.

Applied science is the application of scientific knowledge transferred into a physical environment. Examples include testing a theoretical model through the use of formal science, or solving a practical problem through the use of natural science.

Fields of engineering are closely related to **applied sciences**. Applied science is important for technology development. Its use in industrial settings is usually referred to as research and development (R&D).

Applied science differs from **fundamental science**, which seeks to describe the most basic objects and forces, having less emphasis on practical applications.

Behaviour therapy and applied behaviour analysis. Emphasizing the empirical roots of behaviour modification, some authors consider it to be broader in scope and to subsume the other two categories of behaviour change methods. Since techniques derived from behavioural psychology tend to be the most effective in altering behaviour, most practitioners consider behaviour modification along with behaviour therapy and applied behaviour analysis to be founded in **behaviourism.** While behaviour modification encompasses applied behaviour analysis and typically uses interventions based on the same behavioural principles, many behaviour modifiers who are not applied behaviour analysts tend to use packages of interventions and do not conduct functional assessments before intervening.

In recent years, the concept of **punishment** has had many critics, though these criticisms tend not to apply to negative punishment (time-outs) and usually apply to the addition of some aversive event. The use of positive punishment by board-certified behaviour analysts is restricted to extreme circumstances when all other forms of treatment have failed and when the behaviour to be modified is a danger to the person or to others. In clinical settings positive punishment is usually restricted to using a spray bottle filled with water as an aversive event. When misused, more aversive punishment can lead to affective (emotional) disorders, as well as to the receiver of the punishment increasingly trying to avoid the punishment (i.e., "not get caught").

Behaviour modification might be a complementary term, since successful weight loss behaviour modification aims at reducing caloric intake, increasing physical activity and expanding your nutrition knowledge and food choices indefinitely. **Behaviour modification** is a treatment approach, based on the principles of operant conditioning, that replaces undesirable behaviours with more desirable ones through positive or negative **reinforcement**.

Behaviour modification is the use of empirically demonstrated behaviour change techniques to improve behaviour, such as altering an individual's behaviours and reactions to stimuli through positive and negative reinforcement of adaptive behaviour and/or the reduction of maladaptive behaviour through its "extinction", punishment and/or therapy.

Behavioural sciences (or **behavioural sciences**) encompasses all the disciplines that explore the activities of and interactions among organisms in the natural world. It involves the systematic analysis and investigation of human and animal behaviour through controlled and naturalistic experimental observations and rigorous formulations. Examples of behavioural sciences include, psychology, cognitive science, and anthropology.

The term **behavioural sciences** is often confused with the term **social sciences.** Though these two broad areas are interrelated and study systematic processes of behaviour, they differ on their level of scientific analysis of various dimensions of behaviour.

Behavioural sciences abstract empirical data to investigate the decision processes and communication strategies within and between organisms in a social system. This involves fields like psychology, social neuroscience, and genetics among others.

Behavioural sciences includes two broad categories: neural - *decision* **sciences - and social - communication sciences.** Decision sciences involves those disciplines primarily dealing with the decision processes and individual functioning used in the survival of organism in a social environment. These include anthropology, psychology, cognitive science, organization theory, psychobiology, and social neuroscience.

Bioelectrical Impedance (BIA) – These are scales and hand-held devises that run low-level (and painless) electrical current through you. They can be accurate, although the accuracy varies according to the specific device (do your research) and how it is used. Best results are obtained first thing in the morning with no alcohol consumed for 2 days prior, and no exercise the night before. **Bioelectrical Impedance** is another method of assessing body fat percentage. There are a variety of body composition and body fat analyzers and scales available for home use that provide more than just total weight measurements. These devices determine total weight, the percent and amount of body fat, muscle mass, water, and even bone mass. While the readings can be affected by hydration levels, food intake, skin temperature, and other factors, if you follow the directions and take the reading under similar conditions, you will obtain the best results.

Body Fat measurement - There are several ways to find out your body fat percentage. Unfortunately, the more accurate the method, the more of a hassle and/or expensive it tends to be. This is a short capsule summary.

Body fat - is a lipid (fat) produced in the body, and this may be influenced by diet, exercise and genetics. Body fat percentage is that percentage of body mass that is not made up of bone, muscle, connective tissue and fluids; that is, everything else. (This is referred to as 'fat-free mass'.)

Contingency management involves developing methods to help recovery from episodes of overeating or weight regain.

Cognitive behavioural therapy (or **cognitive behavioural therapies** or **CBT**) is a psychotherapeutic approach that aims to solve problems concerning dysfunctional emotions, behaviours and cognitions through a goal-oriented, systematic procedure. The title is used in diverse ways to designate behaviour therapy, cognitive therapy, and to refer to therapy based upon a combination of basic behavioural and cognitive research.

Cognitive restructuring teaches patients to think in a positive manner and to correct thoughts that undermine weight management efforts. Cognitive techniques also help patients accept realistic, but less-than-desired, weight losses. Inappropriate feelings of failure after achieving modest but clinically-important weight loss can lead to relapse and weight regain.

DEXA scan – full body X-ray scan of the same type used for bone density. Very accurate.

Eating habits (or food habits) refers to why and how people eat, which foods they eat, and with whom they eat, as well as the ways people obtain, store, use, and discard food.

Fat-free mass - is comprised of the nonfat components of the human body. Skeletal muscle, bone and water are all examples of fat-free mass.

Fixed-alternative questions provide multiple-choice answers. These types of questions are good when the possible replies are few and clear-cut, such as age, car ownership, etc.

Form of Question Response

Questions can be designed for open-ended, dichotomous, or multichotomous responses.

- **Open-ended** responses are difficult to evaluate, but are useful early in the research process for determining the possible range of responses.
- **Dichotomous** questions have two possible opposing responses, for example, "Yes" and "No".
- **Multichotomous** questions have a range of responses as in a multiple choice test.

Functional behavioural assessment is called the "ABC" approach, where observations are made on **A**ntecedents, **Behaviour**s, and **C**onsequences. In other words, "What comes directly before the behaviour?", "What does the behaviour look like?", and "What comes directly after

the behaviour?" Once enough observations are made, the data are analyzed and patterns are identified. If there are consistent antecedents and/or consequences, an intervention should target those to increase or decrease the target behaviour. This method forms the core of positive behaviour support for schoolchildren in both regular and special education.

The questionnaire is a structured technique for collecting primary data in a marketing survey. It is a series of written or verbal questions for which the respondent provides answers. A well-designed questionnaire motivates the respondent to provide complete and accurate information.

The survey questionnaire should not be viewed as a stand-alone tool. Along with the questionnaire there is field work, rewards for the respondents, and communication aids, all of which are important components of the questionnaire process.

Harris Benedict Equation is a formula that uses your BMR and then applies an activity factor to determine your total daily energy expenditure (calories). The only factor omitted by the Harris Benedict Equation is lean body mass. Remember, leaner bodies need more calories than less leaner ones. Therefore, this equation will be very accurate in all but the very muscular (will under-estimate calorie needs) and the very fat (will over-estimate calorie needs).

Health care is the prevention, treatment, and management of illness and the preservation of mental and physical well being through the services offered by the medical, nursing, and allied health professions. According to the World Health Organization, health care embraces all the goods and services designed to promote health, including “preventive, curative and palliative interventions, whether directed to individuals or to populations”. The organized provision of such services may constitute a health care system. This can include a specific governmental organization such as the National Health Service in the UK, or a cooperation across the National Health Service and Social Services as in shared care.

There are many different branches of medicine; the other health care professions also have specialties or focus on specific populations or settings of care. Public health studies the effect of environmental factors such as available health care resources on the health of the general population, often focusing on particular populations, such as mothers and children. Dietitians educate people about proper nutrition, particularly specific dietary needs of populations such as

people with diabetes, breastfeeding women, and people with celiac disease. Other less common medical areas include first aid and triage.

Health research builds upon the natural sciences of biology, chemistry, and physics as well as a variety of multidisciplinary fields. Some of the other primarily research-oriented fields that make contributions to health science are biochemistry, epidemiology, genetics, and pharmacology.

Health science: the study and research of the food that we eat; and the study and research of health-related issues to understand how humans and other animals function, and the application of that knowledge to improve health and to prevent and cure diseases.

Hydrostatic Weighing – Weighing under water (completely submerged, with all air blown out of lungs) – Very accurate when done professionally.

Navy tape measure method - This is a formula based on several body measurements taken with a tape measure. It can be quite accurate (it is used by the military), but it does depend upon your ability to accurately measure. Using centimeters rather than inches is the best, but using inches within ¼ of an inch works. To be sure, measure yourself 3 times and take the average. I have a calculator using this method. It is especially useful for tracking yourself over time.

Open-ended questions allow the respondent to better express his/her answer, but are more difficult to administer and analyze. Often, open-ended questions are administered in a depth interview. This technique is most appropriate for exploratory research.

Physical Activity -All bodily movements that result in energy expenditure. This includes daily routine activities such as household jobs, shopping, work.

Problem solving is a systematic method of analyzing problems and identifying possible solutions.

Projective methods use a vague question or stimulus and attempt to project a person's attitudes from the response. The questionnaire could use techniques such as word associations and fill-in-the-blank sentences. Projective methods are difficult to analyze and are better suited for exploratory research than for descriptive or causal research.

Qualitative data - Narrative descriptions or observations.

Qualitative research - Research in which the data are narrative descriptions or observations. In most qualitative research, there is an emphasis on the influence of context.

Quantitative data - Numbers and measurements.

Quantitative research - Research in which the data are numbers and measurements. In quantitative research, there is an emphasis on control of the variables in the study.

Rating scales: graphic, itemized, and comparative.

- **Graphic** - simply a line on which one marks an X anywhere between the extremes with an infinite number of places where the X can be placed.
- **Itemized** - similar to graphic except there are a limited number of categories that can be marked.
- **Comparative** - the respondent compares one attribute to others. Examples include the Q-sort technique and the constant sum method, which requires one to divide a fixed number of points among the alternatives.

Recall loss occurs when people forget that an event even occurred. For recent events, telescoping error dominates; for events that happened in the distant past, recall loss dominates.

Self-monitoring is the most important component of behaviour therapy for obesity and involves keeping daily records of food intake and physical activity, and checking weight regularly. Self-monitoring records can provide information needed to identify links in the behaviour chain that can be targeted for intervention. In addition, record keeping enhances compliance with dietary and physical activity interventions.

Skin-fold calipers ("pinch test") – Simple, but needs to be done by someone who is trained, and you can't do it on yourself. Wide variations in accuracy for people without training.

Social Sciences provide a perceptive framework to study the processes of a social system through impacts of social organization on structural adjustment of the individual and of groups. They typically include fields like sociology, economics, history, counselling, public health, anthropology, and political science.

Social support from family members and friends is important for modifying lifestyle behaviours.

Stimulus control is the process of avoiding triggers that prompt eating.

Stress management is used to decrease the negative impact of stress on positive behaviour patterns.

Telescoping error is an error resulting from the tendency of people to remember events as occurring more recently than they actually did.

t-Test - assesses whether the means of two groups are *statistically* different from each other. This analysis is appropriate whenever you want to compare the means of two groups, and

especially appropriate as the analysis for the posttest-only two-group randomized experimental design

Weight Management -Weight management means keeping your body weight at a healthy level.

Acronyms

AE - adverse effects

BT - behavioural treatment

BIA - bio-electrical impedance analysis

BMI - body mass index

BMR – basal metabolic rate

BP - blood pressure

BT - behavioural therapy

Calc -calculated from given data

CDC - Center for Disease Control

CHD - coronary heart disease

CVD - cardiovascular disease

CV - cardiovascular

D - Dietary

DBP - diastolic blood pressure

DEXA - dual x-ray absorptiometry

DM - diabetes mellitus, type 2

DRI - Daily recommended intake

EST - estimated from given data

F - Female

FC - family counseling

FFM - fat free mass

FM - fat mass

FPG - fasting plasma glucose

GP - general practitioner

gr /g- grams

Ht - height

HDL - high-density lipoprotein cholesterol

HOMA - homeostasis model assessment of insulin sensitivity

HMO - health maintenance organization

HR - hazards ratio

IGT - impaired glucose tolerance

ITT - intention-to-treat

Kcal - kilocalorie

Kg - kilogram

Kj - kilojoule

Kg/m^2 kilograms divided by meters squared (formula for BMI)

Lbs - pounds

LCD - Low Calorie Diet

LDL - low-density lipoprotein cholesterol

M - Male

MM – Millimeters

MSG- Monosodium glutamate

N - Number

NA - not applicable

ND- Non Determined

NHANES - National Health and Nutrition Examination Survey

NIH- National Institutes of Health

oz - ounces

OW - overweight

P - P-value

PA - physical activity

PCP - primary care provider

PSM - propensity score matching

PT -parent training

RYGB - Roux-en-Y Gastric Bypass

SA - sedentary activity

SBP - systolic blood pressure

SD - standard deviation

SDS - standard deviation score

SE - standard error

SKF -skin fold thickness

SPSS - Statistical Package for the Social Sciences

SSF - subscapular skinfold thickness

TBW- total body water

TC - total cholesterol

TG - triglycerides

TSF - triceps skinfold

VLCD- Very Low Calorie Diet

VLDL- Very Low Density Lipoproteins

WC- waist circumference

WHO - World Health Organization

Wt- Weight

WLC- Weight Loss Candidate

WLCB- Weight Loss Candidate(s) with Behaviour Modification

WMBMP- Weight Management with Behaviour Modification Programme

y.o. - year old

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THE USE AND EFFECTIVENESS OF BEHAVIOURAL MODIFICATION TECHNIQUES IN ACHIEVING AND MAINTAINING NORMAL WEIGHT AND FITNESS – THE LIFESTYLE CHANGES FOR ADULTS IN CYPRUS

A PROJECT SUBMITTED TO MIDDLESEX UNIVERSITY
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF
PROFESSIONAL STUDIES

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PART II

APRIL, 2011

PART II

- APPENDICES
- LIST OF TABLES
- LIST OF FIGURES
- LIST OF DIAGRAMES

Title: "The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Lifestyle Changes for Adults in Cyprus".

By

Eleni P. Andreou **Christiana M. Philippou**

Appendix

Appendix 1- Analysis of Hypothesis

Appendix 2- Population Distribution

Appendix 3- Results of Questionnaire

Appendix 4 - Results of Checklists & Results of Progress Chart

Appendix 5- Dietary Reference Intakes (DRIs)

Appendix 1- Analysis of Hypothesis

Hypothesis

Research shows that the behavioural modification techniques were the most effective way to achieve and maintain weight loss comparing to diet alone. If the candidates (Weight Loss Candidate with Behaviour Modification-WLCB) used the specific behavioural modification techniques regarding eating and physical activity, then at least two thirds of them would achieve a weight loss of average ½ -1kg per week for the 18 weeks of the treatment and then maintain it or continue to lose after treatment termination with a total treatment period of 36 weeks efficiently and long-lasting compared to the control candidates who followed a diet plan only.

Definition

Behaviour modification is a treatment approach, based on the principles of operant conditioning, that replaces undesirable behaviours with more desirable ones through positive or negative reinforcement. Behaviour modification targets observable and measurable behaviours for change. It is based upon the principle that all behaviour follows a set of consistent rules, and that methods can be developed for defining, observing, and measuring behaviours, and for designing effective interventions (Mather and Goldstein 2001). Behaviour is shaped by its consequences, and under the right set of consequences, all people involved can function effectively. Behaviour modification involves the use of Reinforcement to strengthen behaviour and Punishment to weaken behaviour.

Purpose

Behaviour modification is used to treat a variety of problems in both adults and children. Behaviour modification has been successfully used to treat obsessive-compulsive disorder (OCD), attention-deficit/hyperactivity disorder (ADHD), phobias, enuresis (bed-wetting), generalized anxiety disorder, and separation anxiety disorder (Mather and Goldstein 2001) . For the purpose of this study, the behaviour modification techniques will be used to prove their effectiveness in the treatment of obesity.

Description

Behaviour modification is based on the principles of operant conditioning, which were developed by American behaviourist B. F. Skinner (1904-1990). Skinner formulated the concept of operant conditioning, through which behaviour could be shaped by reinforcement or lack of it. Skinner considered his concept applicable to a wide range of both human and animal behaviours and introduced operant conditioning to the general public in his 1938 book, *The Behaviour of Organisms*.

One behaviour modification technique that is widely used is positive reinforcement, which encourages certain behaviours through a system of rewards. In behaviour therapy, it is common for the therapist to draw up a contract with the client establishing the terms of the reward system.

Another behaviour modification technique is negative reinforcement. Negative reinforcement is a method of training that uses a negative reinforcer. A negative reinforcer is an event or behaviour whose reinforcing properties are associated with its removal. For example, terminating an existing electric shock after a rat presses a bar is a negative reinforcer.

In addition to rewarding desirable behaviour, behaviour modification can also discourage unwanted behaviour, through punishment. Punishment is the application of an aversive or unpleasant stimulus in reaction to a particular behaviour. For children, this could be the removal of television privileges when they disobey their parents or teacher. The removal of reinforcement altogether is called extinction. Extinction eliminates the incentive for unwanted behaviour by withholding the expected response. A widespread parenting technique based on extinction is the time-out, in which a child is separated from the group when he or she misbehaves. This technique removes the expected reward of parental attention.

Due to the **Diversity** considerations regarding the behaviour modification, there are several critics. There are certain populations with greater risk factors for problem behaviours. They include ethnic minority status, academic difficulty (learning disability), broken homes, poverty, inadequate parental supervision, physical abuse, substance abuse (by self or family members), living in a high crime community, and criminal or delinquent relatives or peers (Positive Behaviour Support and Delinquency Prevention 2004). Behaviour modification programs are more commonly needed in public schools where these diverse populations are more prevalent. The impact of cultural values is significant in contribution to individual values, behaviour, and communication. For example, in western culture, a goal of most families is to help

children become independent and self-reliant. However, in many Asian cultures, families strive to create an environment of dependence and belonging. "Self-reliance …. is seen as a sign of selfishness and immaturity." In Western culture, it is acceptable and in fact encouraged to seek help for emotional problems, while in certain Asian cultures, it is considered shameful. Behaviour interventions must include a sensitivity toward cultural differences, and consider the important role that culture plays in the behaviour of the individual and the values of the family and society (Carr 2004).

Appendix 2 – Population distribution

MEN	NICOSIA		LIMASSOL		LARNACA		PAPHOS		FAMAGUSTA	
	RULAR	URBAN	RULAR	URBAN	RULAR	URBAN	RULAR	URBAN	RULAR	URBAN
18-24	7	3	6	1	3	2	2	1	0	2
25-29	6	2	5	1	2	1	2	0	0	1
30-34	5	2	5	1	2	1	1	0	0	1
35-39	7	2	5	1	3	2	1	0	0	2
40-44	7	2	5	1	2	2	2	0	0	1
45-49	7	3	5	1	1	1	1	1	0	1
TOTAL	39	14	31	6	13	9	9	2	0	8
TOTAL MEN	131									
CITY MEN TO TOTAL MEN	*40%*		*28%*		*17%*		*8%*		*6%*	*100%*
CITY MEN TO TOTAL POPULATION	*16%*		*11%*		*7%*		*3%*		*2%*	*39%*

WOMEN	NICOSIA		LIMASSOL		LARNAKA		PAPHOS		FAMAGUSTA	
	RULAR	URBAN	RULAR	URBAN	RULAR	URBAN	RULAR	URBAN	RULAR	URBAN
18-24	11	3	8	1	4	3	2	1	0	3
25-29	11	2	9	1	4	2	3	0	0	1
30-34	10	3	9	1	4	2	2	1	0	2
35-39	11	4	9	2	4	2	3	2	0	2
40-44	11	3	8	2	3	2	2	1	0	2
45-49	11	4	6	1	2	2	2	0	0	2
TOTAL	65	19	49	8	21	13	14	5	0	12
TOTAL WOMEN	206									
CITY WMN TO TOTAL WMN	*41%*		*28%*		*17%*		*9%*		*6%*	*100%*
CITY WMN TO TOTAL POPULATION	*25%*		*17%*		*10%*		*6%*		*4%*	*61%*

TOTAL	NICOSIA		LIMASSOL		LARNAKA		PAPHOS		FAMAGUSTA	
	RULAR	URBAN	RULAR	URBAN	RULAR	URBAN	RULAR	URBAN	RULAR	URBAN
18-24	18	6	14	2	7	5	4	2	0	5
25-29	17	4	14	2	6	3	5	0	0	2
30-34	15	5	14	2	6	3	3	1	0	3
35-39	18	6	14	3	7	4	4	2	0	4
40-44	18	5	13	3	5	4	4	1	0	3
45-49	18	7	11	2	3	3	3	1	0	3
TOTAL	104	33	80	14	34	22	23	7	0	20
TOTAL POPULATION	337									
CITY TOTAL TO TOTAL POPULATION	*40,7%*		*27,9%*		*16,6%*		*8,9%*		*5,9%*	*100%*

Appendix 3- Results of Questionnaire

Summary table for each type of demographic data

		Column N %
Occupation	Agriculture	,0%
	Industry	1,7%
	Mental Involvement/Office Work	53,0%
	Student	24,8%
	Housewife	4,3%
	Retired	,0%
	Unemployed	2,0%
	Other	14,2%
	Total	100,0%
Total number of years of education	up to 10	19,5%
	11-12	16,5%
	13-14	17,5%
	15-16	13,8%
	17-18	20,5%
	more than 18	12,1%
	Total	100,0%
Family Status	Married	58,6%
	Divorced	6,7%
	Single	32,0%
	Widow	2,7%
	Total	100,0%
Number of people living in the same houshold with you	up to 2	18,3%
	3-4	63,7%
	5-6	12,9%
	more than 6	5,0%
	Total	100,0%

	NO	YES	Total
	Row N %	Row N %	Row N %
Weight	93,7%	6,3%	100,0%
Smoking	92,4%	7,6%	100,0%
Blood Preasure	95,9%	4,1%	100,0%
Sugar	94,6%	5,4%	100,0%
Underweight	91,7%	8,3%	100,0%
Iron	98,7%	1,3%	100,0%
Cancer	73,7%	26,3%	100,0%
Aids	91,1%	8,9%	100,0%
Heart Attack	75,9%	24,1%	100,0%
Anemia	89,5%	10,5%	100,0%
Diabetes	89,8%	10,2%	100,0%
Alcohol	96,2%	3,8%	100,0%
Anorexia	97,5%	2,5%	100,0%
Obesity	79,0%	21,0%	100,0%
Drags	89,8%	10,2%	100,0%
Kidneys	98,4%	1,6%	100,0%
Egkefaliko	98,4%	1,6%	100,0%

	Do not consume or use	Consume or use 2-3 times/month	Consume or use weekly	Consume or use daily	Total
	Row N %	Row N %	Row N %	Row N %	Row N %
Alcohol	39,0%	38,4%	21,3%	1,3%	100,0%
Artificial Sweeteners	39,4%	15,6%	20,0%	25,1%	100,0%
Candy or other sweets	8,9%	33,0%	37,5%	20,6%	100,0%
Carbonated beverages	22,5%	24,4%	35,9%	17,1%	100,0%
Chewing Tabacco	93,2%	,0%	1,3%	5,5%	100,0%
Cigarettes	86,7%	,0%	1,9%	11,3%	100,0%
Cigars	96,8%	,0%	,0%	3,2%	100,0%
Coffee	9,5%	3,8%	8,6%	78,1%	100,0%
Eat Fast Food	17,1%	41,3%	40,3%	1,3%	100,0%
Fried Food	28,6%	29,2%	41,0%	1,3%	100,0%
Luncheon meats/hot dogs	48,9%	24,8%	17,4%	9,0%	100,0%
Margarine	24,8%	23,8%	28,6%	22,9%	100,0%
Milk products	1,9%	5,1%	10,5%	82,5%	100,0%
Non Herbal tea	41,6%	33,3%	7,0%	18,1%	100,0%
Refined flour/ baged goods	6,9%	28,5%	40,0%	24,6%	100,0%
Refined sugar	50,2%	17,8%	16,8%	15,2%	100,0%
Vitamins and Minerals	47,2%	27,8%	6,8%	18,1%	100,0%
Water destrilled	62,5%	13,0%	5,1%	19,4%	100,0%
Water Tap	48,9%	11,4%	8,9%	30,8%	100,0%
Water well	22,2%	4,8%	1,3%	71,7%	100,0%
Diet often	52,1%	9,5%	6,7%	31,7%	100,0%

Singularly analysis of demographic

Occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Industry	5	1,6	1,7	1,7
	Mental Involvement/Office Work	160	50,8	53,0	54,6
	Student	75	23,8	24,8	79,5
	Housewife	13	4,1	4,3	83,8
	Unemployed	6	1,9	2,0	85,8
	Other	43	13,7	14,2	100,0
	Total	302	95,9	100,0	
Missing	System	13	4,1		
Total		315	100,0		

Family Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married	174	55,2	58,6	58,6
	Divorced	20	6,3	6,7	65,3
	Single	95	30,2	32,0	97,3
	Widow	8	2,5	2,7	100,0
	Total	297	94,3	100,0	
Missing	System	18	5,7		
Total		315	100,0		

Number of people living in the same houshold with you

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	up to 2	51	16,2	18,3	18,3
	3-4	177	56,2	63,7	82,0
	5-6	36	11,4	12,9	95,0
	more than 6	14	4,4	5,0	100,0
	Total	278	88,3	100,0	
Missing	System	37	11,7		
Total		315	100,0		

Weight

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	295	93,7	93,7	93,7
	YES	20	6,3	6,3	100,0
	Total	315	100,0	100,0	

Smoking

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	291	92,4	92,4	92,4
	YES	24	7,6	7,6	100,0
	Total	315	100,0	100,0	

Blood Preasure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	302	95,9	95,9	95,9
	YES	13	4,1	4,1	100,0
	Total	315	100,0	100,0	

Sugar

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	298	94,6	94,6	94,6
	YES	17	5,4	5,4	100,0
	Total	315	100,0	100,0	

Underweight

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	289	91,7	91,7	91,7
	YES	26	8,3	8,3	100,0
	Total	315	100,0	100,0	

Iron

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	311	98,7	98,7	98,7
	YES	4	1,3	1,3	100,0
	Total	315	100,0	100,0	

Cancer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	232	73,7	73,7	73,7
	YES	83	26,3	26,3	100,0
	Total	315	100,0	100,0	

Aids

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	287	91,1	91,1	91,1
	YES	28	8,9	8,9	100,0
	Total	315	100,0	100,0	

Heart Attack

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	239	75,9	75,9	75,9
	YES	76	24,1	24,1	100,0
	Total	315	100,0	100,0	

Anemia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	282	89,5	89,5	89,5
	YES	33	10,5	10,5	100,0
	Total	315	100,0	100,0	

Diabetes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	283	89,8	89,8	89,8
	YES	32	10,2	10,2	100,0
	Total	315	100,0	100,0	

Alcohol

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	303	96,2	96,2	96,2
	YES	12	3,8	3,8	100,0
	Total	315	100,0	100,0	

Anorexia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	307	97,5	97,5	97,5
	YES	8	2,5	2,5	100,0
	Total	315	100,0	100,0	

Obesity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	249	79,0	79,0	79,0
	YES	66	21,0	21,0	100,0
	Total	315	100,0	100,0	

Drugs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	283	89,8	89,8	89,8
	YES	32	10,2	10,2	100,0
	Total	315	100,0	100,0	

Kidneys

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	310	98,4	98,4	98,4
	YES	5	1,6	1,6	100,0
	Total	315	100,0	100,0	

Egkefaliko

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	310	98,4	98,4	98,4
	YES	5	1,6	1,6	100,0
	Total	315	100,0	100,0	

Alcohol

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	123	39,0	39,0	39,0
	Consume or use 2-3 times/month	121	38,4	38,4	77,5
	Consume or use weekly	67	21,3	21,3	98,7
	Consume or use daily	4	1,3	1,3	100,0
	Total	315	100,0	100,0	

Artificial Sweeteners

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	124	39,4	39,4	39,4
	Consume or use 2-3 times/month	49	15,6	15,6	54,9
	Consume or use weekly	63	20,0	20,0	74,9
	Consume or use daily	79	25,1	25,1	100,0
	Total	315	100,0	100,0	

Candy or other sweets

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	28	8,9	8,9	8,9
	Consume or use 2-3 times/month	104	33,0	33,0	41,9
	Consume or use weekly	118	37,5	37,5	79,4
	Consume or use daily	65	20,6	20,6	100,0
	Total	315	100,0	100,0	

Carbonated beverages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	71	22,5	22,5	22,5
	Consume or use 2-3 times/month	77	24,4	24,4	47,0
	Consume or use weekly	113	35,9	35,9	82,9
	Consume or use daily	54	17,1	17,1	100,0
	Total	315	100,0	100,0	

Chewing Tabacco

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	288	91,4	93,2	93,2
	Consume or use weekly	4	1,3	1,3	94,5
	Consume or use daily	17	5,4	5,5	100,0
	Total	309	98,1	100,0	
Missing	System	6	1,9		
Total		315	100,0		

Cigarettes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-3	1	,3	,3	,3
	Do not consume or use	268	85,1	86,7	87,1
	Consume or use daily	34	10,8	11,0	98,1
	5	6	1,9	1,9	100,0
	Total	309	98,1	100,0	
Missing	System	6	1,9		
Total		315	100,0		

Cigars

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	305	96,8	96,8	96,8
	Consume or use daily	10	3,2	3,2	100,0
	Total	315	100,0	100,0	

Coffee

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	30	9,5	9,5	9,5
	Consume or use 2-3 times/month	12	3,8	3,8	13,3
	Consume or use weekly	21	6,7	6,7	20,0
	Consume or use daily	246	78,1	78,1	98,1
	5	6	1,9	1,9	100,0
	Total	315	100,0	100,0	

Eat Fast Food

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	54	17,1	17,1	17,1
	Consume or use 2-3 times/month	130	41,3	41,3	58,4
	Consume or use weekly	127	40,3	40,3	98,7
	Consume or use daily	4	1,3	1,3	100,0
	Total	315	100,0	100,0	

Fried Food

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	90	28,6	28,6	28,6
	Consume or use 2-3 times/month	92	29,2	29,2	57,8
	Consume or use weekly	125	39,7	39,7	97,5
	Consume or use daily	4	1,3	1,3	98,7
	21	4	1,3	1,3	100,0
	Total	315	100,0	100,0	

Luncheon meats/hot dogs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	152	48,3	48,9	48,9
	Consume or use 2-3 times/month	77	24,4	24,8	73,6
	Consume or use weekly	54	17,1	17,4	91,0
	Consume or use daily	28	8,9	9,0	100,0
	Total	311	98,7	100,0	
Missing	System	4	1,3		
Total		315	100,0		

Margarine

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	78	24,8	24,8	24,8
	Consume or use 2-3 times/month	75	23,8	23,8	48,6
	Consume or use weekly	90	28,6	28,6	77,1
	Consume or use daily	72	22,9	22,9	100,0
	Total	315	100,0	100,0	

Milk products

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	6	1,9	1,9	1,9
	Consume or use 2-3 times/month	16	5,1	5,1	7,0
	Consume or use weekly	33	10,5	10,5	17,5
	Consume or use daily	260	82,5	82,5	100,0
	Total	315	100,0	100,0	

Non Herbal tea

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	131	41,6	41,6	41,6
	Consume or use 2-3 times/month	105	33,3	33,3	74,9
	Consume or use weekly	22	7,0	7,0	81,9
	Consume or use daily	57	18,1	18,1	100,0
	Total	315	100,0	100,0	

Refined flour/ baged goods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	21	6,7	6,9	6,9
	Consume or use 2-3 times/month	87	27,6	28,5	35,4
	Consume or use weekly	122	38,7	40,0	75,4
	Consume or use daily	75	23,8	24,6	100,0
	Total	305	96,8	100,0	
Missing	System	10	3,2		
Total		315	100,0		

Refined sugar

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	158	50,2	50,2	50,2
	Consume or use 2-3 times/month	56	17,8	17,8	67,9
	Consume or use weekly	53	16,8	16,8	84,8
	Consume or use daily	48	15,2	15,2	100,0
	Total	315	100,0	100,0	

Vitamins and Minerals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	146	46,3	47,2	47,2
	Consume or use 2-3 times/month	86	27,3	27,8	75,1
	Consume or use weekly	21	6,7	6,8	81,9
	Consume or use daily	56	17,8	18,1	100,0
	Total	309	98,1	100,0	
Missing	System	6	1,9		
Total		315	100,0		

Water destrilled

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	197	62,5	62,5	62,5
	Consume or use 2-3 times/month	41	13,0	13,0	75,6
	Consume or use weekly	16	5,1	5,1	80,6
	Consume or use daily	61	19,4	19,4	100,0
	Total	315	100,0	100,0	

Water Tap

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	154	48,9	48,9	48,9
	Consume or use 2-3 times/month	36	11,4	11,4	60,3
	Consume or use weekly	28	8,9	8,9	69,2
	Consume or use daily	97	30,8	30,8	100,0
	Total	315	100,0	100,0	

Water well

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	70	22,2	22,2	22,2
	Consume or use 2-3 times/month	15	4,8	4,8	27,0
	Consume or use weekly	4	1,3	1,3	28,3
	Consume or use daily	226	71,7	71,7	100,0
	Total	315	100,0	100,0	

Diet often

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	164	52,1	52,1	52,1
	Consume or use 2-3 times/month	30	9,5	9,5	61,6
	Consume or use weekly	21	6,7	6,7	68,3
	Consume or use daily	100	31,7	31,7	100,0
	Total	315	100,0	100,0	

Frequencies

Diet - Alcohol

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	123	39.0	39.0	39.0
	Consume or use 2-3 times per month	121	38.4	38.4	77.5
	Consume or use weekly	67	21.3	21.3	98.7
	Consume or use daily	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Diet - Artificial sweeteners

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	124	39.4	39.4	39.4
	Consume or use 2-3 times per month	49	15.6	15.6	54.9
	Consume or use weekly	63	20.0	20.0	74.9
	Consume or use daily	79	25.1	25.1	100.0
	Total	315	100.0	100.0	

Diet - Candy or other sweets

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	28	8.9	8.9	8.9
	Consume or use 2-3 times per month	104	33.0	33.0	41.9
	Consume or use weekly	118	37.5	37.5	79.4
	Consume or use daily	65	20.6	20.6	100.0
	Total	315	100.0	100.0	

Diet - Carbonated beverages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	71	22.5	22.5	22.5
	Consume or use 2-3 times per month	77	24.4	24.4	47.0
	Consume or use weekly	113	35.9	35.9	82.9
	Consume or use daily	54	17.1	17.1	100.0
	Total	315	100.0	100.0	

Diet - Chewing tobacco

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	288	91.4	93.2	93.2
	Consume or use weekly	4	1.3	1.3	94.5
	Consume or use daily	17	5.4	5.5	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Diet - Cigarettes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-3	1	.3	.3	.3
	Do not consume or use	268	85.1	86.7	87.1
	Consume or use daily	34	10.8	11.0	98.1
	5	6	1.9	1.9	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Diet - Cigars

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	305	96.8	96.8	96.8
	Consume or use daily	10	3.2	3.2	100.0
	Total	315	100.0	100.0	

Diet - Coffee

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	30	9.5	9.5	9.5
	Consume or use 2-3 times per month	12	3.8	3.8	13.3
	Consume or use weekly	21	6.7	6.7	20.0
	Consume or use daily	246	78.1	78.1	98.1
	5	6	1.9	1.9	100.0
	Total	315	100.0	100.0	

Diet - Eat fast food regularly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	54	17.1	17.1	17.1
	Consume or use 2-3 times per month	130	41.3	41.3	58.4
	Consume or use weekly	127	40.3	40.3	98.7
	Consume or use daily	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Diet - Fried foods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	90	28.6	28.6	28.6
	Consume or use 2-3 times per month	92	29.2	29.2	57.8
	Consume or use weekly	125	39.7	39.7	97.5
	Consume or use daily	4	1.3	1.3	98.7
	21	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Diet - Luncheon meats / hot dogs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	152	48.3	48.9	48.9
	Consume or use 2-3 times per month	77	24.4	24.8	73.6
	Consume or use weekly	54	17.1	17.4	91.0
	Consume or use daily	28	8.9	9.0	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

Diet - Margarine

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	78	24.8	24.8	24.8
	Consume or use 2-3 times per month	75	23.8	23.8	48.6
	Consume or use weekly	90	28.6	28.6	77.1
	Consume or use daily	72	22.9	22.9	100.0
	Total	315	100.0	100.0	

Diet - Milk products

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	6	1.9	1.9	1.9
	Consume or use 2-3 times per month	16	5.1	5.1	7.0
	Consume or use weekly	33	10.5	10.5	17.5
	Consume or use daily	260	82.5	82.5	100.0
	Total	315	100.0	100.0	

Diet - Non-herbal tea

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	131	41.6	41.6	41.6
	Consume or use 2-3 times per month	105	33.3	33.3	74.9
	Consume or use weekly	22	7.0	7.0	81.9
	Consume or use daily	57	18.1	18.1	100.0
	Total	315	100.0	100.0	

Diet - Refined flour / baked goods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	21	6.7	6.9	6.9
	Consume or use 2-3 times per month	87	27.6	28.5	35.4
	Consume or use weekly	122	38.7	40.0	75.4
	Consume or use daily	75	23.8	24.6	100.0
	Total	305	96.8	100.0	
Missing	System	10	3.2		
Total		315	100.0		

Diet - Refined sugar

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	158	50.2	50.2	50.2
	Consume or use 2-3 times per month	56	17.8	17.8	67.9
	Consume or use weekly	53	16.8	16.8	84.8
	Consume or use daily	48	15.2	15.2	100.0
	Total	315	100.0	100.0	

Diet - Vitamins and minerals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	146	46.3	47.2	47.2
	Consume or use 2-3 times per month	86	27.3	27.8	75.1
	Consume or use weekly	21	6.7	6.8	81.9
	Consume or use daily	56	17.8	18.1	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Diet - Water, distilled

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	197	62.5	62.5	62.5
	Consume or use 2-3 times per month	41	13.0	13.0	75.6
	Consume or use weekly	16	5.1	5.1	80.6
	Consume or use daily	61	19.4	19.4	100.0
	Total	315	100.0	100.0	

Diet - Water, tap

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	154	48.9	48.9	48.9
	Consume or use 2-3 times per month	36	11.4	11.4	60.3
	Consume or use weekly	28	8.9	8.9	69.2
	Consume or use daily	97	30.8	30.8	100.0
	Total	315	100.0	100.0	

Diet - Water, well

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	70	22.2	22.2	22.2
	Consume or use 2-3 times per month	15	4.8	4.8	27.0
	Consume or use weekly	4	1.3	1.3	28.3
	Consume or use daily	226	71.7	71.7	100.0
	Total	315	100.0	100.0	

Diet - Diet often

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume or use	164	52.1	52.1	52.1
	Consume or use 2-3 times per month	30	9.5	9.5	61.6
	Consume or use weekly	21	6.7	6.7	68.3
	Consume or use daily	100	31.7	31.7	100.0
	Total	315	100.0	100.0	

Times you exercise per week

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	75	23.8	23.8	23.8
	once a week	100	31.7	31.7	55.6
	2-4 times/week	105	33.3	33.3	88.9
	5 times a week	35	11.1	11.1	100.0
	Total	315	100.0	100.0	

Changed job

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I did not change	223	70.8	70.8	70.8
	Within the last 12 months	63	20.0	20.0	90.8
	Within the last 6 months	17	5.4	5.4	96.2
	Within the last 2 months	12	3.8	3.8	100.0
	Total	315	100.0	100.0	

Divorced

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	262	83.2	83.2	83.2
	Within the last 2 years	29	9.2	9.2	92.4
	Within the last year	20	6.3	6.3	98.7
	9	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Work over 60 hours/week

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	199	63.2	63.2	63.2
	Occasionally	29	9.2	9.2	72.4
	Usually	28	8.9	8.9	81.3
	Always	54	17.1	17.1	98.4
	7	5	1.6	1.6	100.0
	Total	315	100.0	100.0	

Medication - Antacids

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	291	92.4	92.4	92.4
	Currently taken or have taken in the last month	20	6.3	6.3	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Medications - Antibiotics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	203	64.4	64.4	64.4
	Currently taken or have taken in the last month	97	30.8	30.8	95.2
	2	6	1.9	1.9	97.1
	3	9	2.9	2.9	100.0
	Total	315	100.0	100.0	

Medications - Anticonvulsants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	267	84.8	84.8	84.8
	Currently taken or have taken in the last month	48	15.2	15.2	100.0
	Total	315	100.0	100.0	

Medications - Antidepressants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	252	80.0	80.0	80.0
	Currently taken or have taken in the last month	63	20.0	20.0	100.0
	Total	315	100.0	100.0	

Medications - Antifungal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	217	68.9	68.9	68.9
	Currently taken or have taken in the last month	98	31.1	31.1	100.0
	Total	315	100.0	100.0	

Medications - Aspirin / Ibuprofen

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	197	62.5	66.3	66.3
	Currently taken or have taken in the last month	95	30.2	32.0	98.3
	2	5	1.6	1.7	100.0
	Total	297	94.3	100.0	
Missing	System	18	5.7		
Total		315	100.0		

Medications - Asthma inhalers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	261	82.9	82.9	82.9
	Currently taken or have taken in the last month	54	17.1	17.1	100.0
	Total	315	100.0	100.0	

Medications - Beta blockers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	261	82.9	82.9	82.9
	Currently taken or have taken in the last month	54	17.1	17.1	100.0
	Total	315	100.0	100.0	

Medications - Chemotherapy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	291	92.4	100.0	100.0
Missing	System	24	7.6		
Total		315	100.0		

Medications - Cortisone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	315	100.0	100.0	100.0

Medications - Diabetic medications

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	303	96.2	96.2	96.2
	Currently taken or have taken in the last month	12	3.8	3.8	100.0
	Total	315	100.0	100.0	

Medications - Diuretics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	299	94.9	94.9	94.9
	Currently taken or have taken in the last month	16	5.1	5.1	100.0
	Total	315	100.0	100.0	

Medications - Estrogen / Progesterone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	315	100.0	100.0	100.0

Medications - Heart medications

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	256	81.3	81.3	81.3
	Currently taken or have taken in the last month	54	17.1	17.1	98.4
	2	5	1.6	1.6	100.0
	Total	315	100.0	100.0	

Medications - High blood pressure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	256	81.3	81.3	81.3
	Currently taken or have taken in the last month	59	18.7	18.7	100.0
	Total	315	100.0	100.0	

Medications - Hormone therapy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	257	81.6	81.6	81.6
	Currently taken or have taken in the last month	4	1.3	1.3	82.9
	2	54	17.1	17.1	100.0
	Total	315	100.0	100.0	

Medications - Laxatives

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	249	79.0	79.0	79.0
	Currently taken or have taken in the last month	62	19.7	19.7	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Medications - Insulin

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	261	82.9	82.9	82.9
	Currently taken or have taken in the last month	54	17.1	17.1	100.0
	Total	315	100.0	100.0	

Medications - Oral / Implant contraceptives

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	261	82.9	82.9	82.9
	Currently taken or have taken in the last month	54	17.1	17.1	100.0
	Total	315	100.0	100.0	

Medications - Radiation exposure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	257	81.6	81.6	81.6
	Currently taken or have taken in the last month	58	18.4	18.4	100.0
	Total	315	100.0	100.0	

Medications - Relaxants / sleeping pills

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	315	100.0	100.0	100.0

Medications - Thyroid medication

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	295	93.7	93.7	93.7
	Currently taken or have taken in the last month	16	5.1	5.1	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Medications - Ulcer medications

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	258	81.9	81.9	81.9
	Currently taken or have taken in the last month	21	6.7	6.7	88.6
	3	36	11.4	11.4	100.0
	Total	315	100.0	100.0	

Medications - Other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	299	94.9	94.9	94.9
	Currently taken or have taken in the last month	16	5.1	5.1	100.0
	Total	315	100.0	100.0	

U. G. S. - Belching or gas within 1 hour of a meal?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	169	53.7	54.3	54.3
	Yes or it is a minor or mild symptom	47	14.9	15.1	69.5
	It is a moderate symptom	52	16.5	16.7	86.2
	It is a severe symptom	43	13.7	13.8	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

U. G. S. - Heartburn or acid reflux?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	223	70.8	71.7	71.7
	Yes or it is a minor or mild symptom	53	16.8	17.0	88.7
	It is a moderate symptom	35	11.1	11.3	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

U. G. S. - Bloating shortly after eating?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	146	46.3	46.3	46.3
	Yes or it is a minor or mild symptom	58	18.4	18.4	64.8
	It is a moderate symptom	70	22.2	22.2	87.0
	It is a severe symptom	41	13.0	13.0	100.0
	Total	315	100.0	100.0	

U. G. S. - Are you a vegan?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	285	90.5	92.2	92.2
	It is a severe symptom	24	7.6	7.8	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

U. G. S. - Bad breath

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	229	72.7	72.7	72.7
	Yes or it is a minor or mild symptom	56	17.8	17.8	90.5
	It is a moderate symptom	24	7.6	7.6	98.1
	It is a severe symptom	6	1.9	1.9	100.0
	Total	315	100.0	100.0	

U. G. S. - Loss of taste for meat?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	244	77.5	77.5	77.5
	Yes or it is a minor or mild symptom	21	6.7	6.7	84.1
	It is a moderate symptom	34	10.8	10.8	94.9
	It is a severe symptom	16	5.1	5.1	100.0
	Total	315	100.0	100.0	

U. G. S. - Sweat has a strong odor?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	247	78.4	78.4	78.4
	Yes or it is a minor or mild symptom	38	12.1	12.1	90.5
	It is a moderate symptom	19	6.0	6.0	96.5
	It is a severe symptom	11	3.5	3.5	100.0
	Total	315	100.0	100.0	

U. G. S. - Stomach upset by taking vitamins?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	253	80.3	80.3	80.3
	Yes or it is a minor or mild symptom	42	13.3	13.3	93.7
	It is a moderate symptom	16	5.1	5.1	98.7
	It is a severe symptom	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

U. G. S. - Sense of excess fullness after meals?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	140	44.4	44.4	44.4
	Yes or it is a minor or mild symptom	89	28.3	28.3	72.7
	It is a moderate symptom	60	19.0	19.0	91.7
	It is a severe symptom	26	8.3	8.3	100.0
	Total	315	100.0	100.0	

U. G. S. - Do you feel like skipping breakfast?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	205	65.1	65.1	65.1
	Yes or it is a minor or mild symptom	45	14.3	14.3	79.4
	It is a moderate symptom	28	8.9	8.9	88.3
	It is a severe symptom	37	11.7	11.7	100.0
	Total	315	100.0	100.0	

U. G. S. - Do you feel better if you don't eat?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	196	62.2	62.2	62.2
	Yes or it is a minor or mild symptom	57	18.1	18.1	80.3
	It is a moderate symptom	33	10.5	10.5	90.8
	It is a severe symptom	29	9.2	9.2	100.0
	Total	315	100.0	100.0	

U. G. S. - Sleepy after meals?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	120	38.1	38.1	38.1
	Yes or it is a minor or mild symptom	52	16.5	16.5	54.6
	It is a moderate symptom	71	22.5	22.5	77.1
	It is a severe symptom	72	22.9	22.9	100.0
	Total	315	100.0	100.0	

U. G. S. - Fingernails chip, peel or break easily?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	209	66.3	66.3	66.3
	Yes or it is a minor or mild symptom	24	7.6	7.6	74.0
	It is a moderate symptom	25	7.9	7.9	81.9
	It is a severe symptom	57	18.1	18.1	100.0
	Total	315	100.0	100.0	

U. G. S. - Anemia unresponsive to iron?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	280	88.9	90.6	90.6
	Yes or it is a minor or mild symptom	17	5.4	5.5	96.1
	It is a moderate symptom	12	3.8	3.9	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

U. G. S. - Stomach pains or cramps?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	176	55.9	55.9	55.9
	Yes or it is a minor or mild symptom	41	13.0	13.0	68.9
	It is a moderate symptom	72	22.9	22.9	91.7
	It is a severe symptom	26	8.3	8.3	100.0
	Total	315	100.0	100.0	

U. G. S. - Diarrhea, chronic?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	291	92.4	92.4	92.4
	Yes or it is a minor or mild symptom	4	1.3	1.3	93.7
	It is a moderate symptom	20	6.3	6.3	100.0
	Total	315	100.0	100.0	

U. G. S. - Diarrhea shortly after meals?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	305	96.8	96.8	96.8
	Yes or it is a minor or mild symptom	4	1.3	1.3	98.1
	It is a moderate symptom	6	1.9	1.9	100.0
	Total	315	100.0	100.0	

U. G. S. - Black or tarry stools?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	259	82.2	82.2	82.2
	Yes or it is a minor or mild symptom	38	12.1	12.1	94.3
	It is a moderate symptom	8	2.5	2.5	96.8
	It is a severe symptom	10	3.2	3.2	100.0
	Total	315	100.0	100.0	

U. G. S. - Undigested food in stool?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No or do not have the symptom	219	69.5	70.9	70.9
	Yes or it is a minor or mild symptom	50	15.9	16.2	87.1
	It is a moderate symptom	40	12.7	12.9	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

L. & G. - Pain between shoulder blades?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	228	72.4	72.4	72.4
	Yes	33	10.5	10.5	82.9
	2	40	12.7	12.7	95.6
	3	14	4.4	4.4	100.0
	Total	315	100.0	100.0	

L. & G. - Stomach upset by greasy foods?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	189	60.0	60.0	60.0
	Yes	58	18.4	18.4	78.4
	2	19	6.0	6.0	84.4
	3	49	15.6	15.6	100.0
	Total	315	100.0	100.0	

L. & G. - Greasy or shiny stools?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	253	80.3	81.9	81.9
	Yes	50	15.9	16.2	98.1
	2	6	1.9	1.9	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

L. & G. - Nausea?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	233	74.0	74.0	74.0
	Yes	52	16.5	16.5	90.5
	2	24	7.6	7.6	98.1
	3	6	1.9	1.9	100.0
	Total	315	100.0	100.0	

L. & G. - Sea, car or airplane sickness (motion sickness)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	233	74.0	74.0	74.0
	Yes	50	15.9	15.9	89.8
	2	32	10.2	10.2	100.0
	Total	315	100.0	100.0	

L. & G. - History of morning sickness?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	279	88.6	88.6	88.6
	Yes	6	1.9	1.9	90.5
	2	24	7.6	7.6	98.1
	3	6	1.9	1.9	100.0
	Total	315	100.0	100.0	

L. & G. - Light or clay colored stools?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	257	81.6	81.6	81.6
	Yes	16	5.1	5.1	86.7
	2	32	10.2	10.2	96.8
	3	10	3.2	3.2	100.0
	Total	315	100.0	100.0	

L. & G. - Dry skin, itchy feet and/or skin peels on feet?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	195	61.9	63.1	63.1
	Yes	46	14.6	14.9	78.0
	2	37	11.7	12.0	90.0
	3	31	9.8	10.0	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

L. & G. - Headache over the eye?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	180	57.1	57.1	57.1
	Yes	59	18.7	18.7	75.9
	2	34	10.8	10.8	86.7
	3	42	13.3	13.3	100.0
	Total	315	100.0	100.0	

L. & G. - Alcoholic beverages (per week)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<3	278	88.3	89.7	89.7
	<7	28	8.9	9.0	98.7
	<14	4	1.3	1.3	100.0
	Total	310	98.4	100.0	
Missing	System	5	1.6		
Total		315	100.0		

L. & G. - Recovering alcoholic?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	284	90.2	91.3	91.3
	Yes	15	4.8	4.8	96.1
	2	12	3.8	3.9	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

L. & G. - Hangovers after drinking alcohol?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	287	91.1	91.1	91.1
	Yes	28	8.9	8.9	100.0
	Total	315	100.0	100.0	

L. & G. - History of drug or alcohol abuse?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	307	97.5	97.5	97.5
	Yes	4	1.3	1.3	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

L. & G. - History of hepatitis?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	315	100.0	100.0	100.0

L. & G. - Long term use of prescription medications?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	297	94.3	94.3	94.3
	Yes	18	5.7	5.7	100.0
	Total	315	100.0	100.0	

L. & G. - Sensitive to chemicals (perfume, cleaning solvents ...)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	286	90.8	90.8	90.8
	Yes	25	7.9	7.9	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

L. & G. - Sensitive to tobacco smoke?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	246	78.1	78.1	78.1
	Yes	14	4.4	4.4	82.5
	2	37	11.7	11.7	94.3
	3	18	5.7	5.7	100.0
	Total	315	100.0	100.0	

L. & G. - Exposure to diesel fumes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	264	83.8	83.8	83.8
	Yes	30	9.5	9.5	93.3
	2	11	3.5	3.5	96.8
	3	10	3.2	3.2	100.0
	Total	315	100.0	100.0	

L. & G. - Pain under right side of rib cage?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	253	80.3	81.9	81.9
	Yes	20	6.3	6.5	88.3
	2	32	10.2	10.4	98.7
	3	4	1.3	1.3	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

L. & G. - Hemorrhoids or varicose veins?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	250	79.4	79.4	79.4
	Yes	14	4.4	4.4	83.8
	2	51	16.2	16.2	100.0
	Total	315	100.0	100.0	

L. & G. - Gallbladder attacks (past or present)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	268	85.1	85.1	85.1
	Yes	14	4.4	4.4	89.5
	2	29	9.2	9.2	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

L. & G. - Gallbladder removed?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	290	92.1	92.1	92.1
	Yes	21	6.7	6.7	98.7
	2	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

L. & G. - Bitter taste in mouth, especially after meals?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	296	94.0	94.0	94.0
	Yes	14	4.4	4.4	98.4
	2	5	1.6	1.6	100.0
	Total	315	100.0	100.0	

L. & G. - Become sick if drinking wine?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	286	90.8	90.8	90.8
	Yes	23	7.3	7.3	98.1
	2	6	1.9	1.9	100.0
	Total	315	100.0	100.0	

L. & G. - If drinking alcohol, easily intoxicated?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	254	80.6	80.6	80.6
	Yes	44	14.0	14.0	94.6
	2	8	2.5	2.5	97.1
	3	9	2.9	2.9	100.0
	Total	315	100.0	100.0	

L. & G. - Aspartame consumption?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	199	63.2	63.2	63.2
	Yes	20	6.3	6.3	69.5
	2	41	13.0	13.0	82.5
	3	55	17.5	17.5	100.0
	Total	315	100.0	100.0	

L. & G. - Bothered by aspartame?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	284	90.2	92.8	92.8
	Yes	22	7.0	7.2	100.0
	Total	306	97.1	100.0	
Missing	System	9	2.9		
Total		315	100.0		

L. & G. - Chronic fatigue?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	191	60.6	60.6	60.6
	Yes	45	14.3	14.3	74.9
	2	67	21.3	21.3	96.2
	3	12	3.8	3.8	100.0
	Total	315	100.0	100.0	

S. I. - Food allergies?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	278	88.3	89.4	89.4
	Yes	14	4.4	4.5	93.9
	2	19	6.0	6.1	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

S. I. - Abdominal bloating 1 to 2 hours after eating?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	193	61.3	61.3	61.3
	Yes	42	13.3	13.3	74.6
	2	58	18.4	18.4	93.0
	3	22	7.0	7.0	100.0
	Total	315	100.0	100.0	

S. I. - Specific foods make you tired or bloated?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	178	56.5	56.5	56.5
	Yes	123	39.0	39.0	95.6
	2	6	1.9	1.9	97.5
	3	8	2.5	2.5	100.0
	Total	315	100.0	100.0	

S. I. - Pulse speeds after eating?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	251	79.7	81.0	81.0
	Yes	52	16.5	16.8	97.7
	2	7	2.2	2.3	100.0
	Total	310	98.4	100.0	
Missing	System	5	1.6		
Total		315	100.0		

S. I. - Airborne allergies?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	302	95.9	97.4	97.4
	3	8	2.5	2.6	100.0
	Total	310	98.4	100.0	
Missing	System	5	1.6		
Total		315	100.0		

S. I. - Experience hives?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	263	83.5	86.5	86.5
	Yes	22	7.0	7.2	93.8
	2	19	6.0	6.3	100.0
	Total	304	96.5	100.0	
Missing	System	11	3.5		
Total		315	100.0		

S. I. - Sinus congestion (stuffy head)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	242	76.8	78.1	78.1
	Yes	18	5.7	5.8	83.9
	2	44	14.0	14.2	98.1
	3	6	1.9	1.9	100.0
	Total	310	98.4	100.0	
Missing	System	5	1.6		
Total		315	100.0		

S. I. - Crave bread or noodles?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	221	70.2	70.2	70.2
	Yes	32	10.2	10.2	80.3
	2	41	13.0	13.0	93.3
	3	21	6.7	6.7	100.0
	Total	315	100.0	100.0	

S. I. - Alternating constipation and diarrhea?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	267	84.8	84.8	84.8
	Yes	8	2.5	2.5	87.3
	2	40	12.7	12.7	100.0
	Total	315	100.0	100.0	

S. I. - Crohn's disease?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	315	100.0	100.0	100.0

S. I. - Wheat or grain sensitivity?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	307	97.5	97.5	97.5
	2	8	2.5	2.5	100.0
	Total	315	100.0	100.0	

S. I. - Dairy sensitivity?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	272	86.3	86.3	86.3
	Yes	32	10.2	10.2	96.5
	2	11	3.5	3.5	100.0
	Total	315	100.0	100.0	

S. I. - Are there foods you could not give up?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	205	65.1	65.1	65.1
	Yes	110	34.9	34.9	100.0
	Total	315	100.0	100.0	

S. I. – Asthma, sinus infections, stuffy nose?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	238	75.6	77.0	77.0
	Yes	55	17.5	17.8	94.8
	2	16	5.1	5.2	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

S. I. - Bizarre vivid or nightmarish dreams?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	187	59.4	61.3	61.3
	Yes	86	27.3	28.2	89.5
	2	7	2.2	2.3	91.8
	3	25	7.9	8.2	100.0
	Total	305	96.8	100.0	
Missing	System	10	3.2		
Total		315	100.0		

S. I. - User over-the-counter pain medications?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	290	92.1	92.1	92.1
	Yes	8	2.5	2.5	94.6
	2	11	3.5	3.5	98.1
	3	6	1.9	1.9	100.0
	Total	315	100.0	100.0	

L. I. - Anus itches?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	259	82.2	87.2	87.2
	Yes	30	9.5	10.1	97.3
	2	8	2.5	2.7	100.0
	Total	297	94.3	100.0	
Missing	System	18	5.7		
Total		315	100.0		

L. I. - Coated tongue?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	265	84.1	87.5	87.5
	Yes	34	10.8	11.2	98.7
	2	4	1.3	1.3	100.0
	Total	303	96.2	100.0	
Missing	System	12	3.8		
Total		315	100.0		

L. I. - Taken any antibiotic for a combined time of:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	231	73.3	77.8	77.8
	<1 month	56	17.8	18.9	96.6
	<3 months	4	1.3	1.3	98.0
	>3 months	6	1.9	2.0	100.0
	Total	297	94.3	100.0	
Missing	System	18	5.7		
Total		315	100.0		

L. I. - Fungus or yeast infections?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	271	86.0	86.0	86.0
	Yes	31	9.8	9.8	95.9
	2	13	4.1	4.1	100.0
	Total	315	100.0	100.0	

L. I. - "Athletes foot", nail fungus?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	274	87.0	88.7	88.7
	Yes	27	8.6	8.7	97.4
	2	8	2.5	2.6	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

L. I. - Eating sugar, starch or drinking alcohol increases yeast symptoms?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	272	86.3	86.3	86.3
	Yes	23	7.3	7.3	93.7
	2	12	3.8	3.8	97.5
	3	8	2.5	2.5	100.0
	Total	315	100.0	100.0	

L. I. - Stool hard or difficult to pass?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	239	75.9	75.9	75.9
	Yes	67	21.3	21.3	97.1
	2	5	1.6	1.6	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

L. I. - History of parasites?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	281	89.2	89.2	89.2
	Yes	12	3.8	3.8	93.0
	2	14	4.4	4.4	97.5
	3	8	2.5	2.5	100.0
	Total	315	100.0	100.0	

L. I. - Less than one bowel movement per day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	283	89.8	89.8	89.8
	Yes	6	1.9	1.9	91.7
	3	26	8.3	8.3	100.0
	Total	315	100.0	100.0	

L. I. - Stools have corners or edges are flat or ribbon shaped?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	259	82.2	82.2	82.2
	Yes	12	3.8	3.8	86.0
	2	32	10.2	10.2	96.2
	3	12	3.8	3.8	100.0
	Total	315	100.0	100.0	

L. I. - Stools are not well formed (loose)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	224	71.1	71.1	71.1
	Yes	37	11.7	11.7	82.9
	2	34	10.8	10.8	93.7
	3	20	6.3	6.3	100.0
	Total	315	100.0	100.0	

L. I. - Irritable bowel or mucus colitis?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	259	82.2	82.2	82.2
	Yes	21	6.7	6.7	88.9
	2	35	11.1	11.1	100.0
	Total	315	100.0	100.0	

L. I. - Blood in stool?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	273	86.7	86.7	86.7
	Yes	34	10.8	10.8	97.5
	2	8	2.5	2.5	100.0
	Total	315	100.0	100.0	

L. I. - Mucus in stool?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	295	93.7	96.7	96.7
	Yes	6	1.9	2.0	98.7
	2	4	1.3	1.3	100.0
	Total	305	96.8	100.0	
Missing	System	10	3.2		
Total		315	100.0		

L. I. - Excessive foul smelling lower bowel gas?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	259	82.2	82.2	82.2
	Yes	24	7.6	7.6	89.8
	2	19	6.0	6.0	95.9
	3	13	4.1	4.1	100.0
	Total	315	100.0	100.0	

L. I. - Bad breath or strong body odors?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	255	81.0	81.0	81.0
	Yes	48	15.2	15.2	96.2
	2	12	3.8	3.8	100.0
	Total	315	100.0	100.0	

L. I. - Painful to press along outer sides of thighs?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	246	78.1	79.1	79.1
	Yes	48	15.2	15.4	94.5
	2	17	5.4	5.5	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

L. I. - Cramping in lower abdominal region?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	246	78.1	82.6	82.6
	Yes	16	5.1	5.4	87.9
	2	32	10.2	10.7	98.7
	3	4	1.3	1.3	100.0
	Total	298	94.6	100.0	
Missing	System	17	5.4		
Total		315	100.0		

L. I. - Dark circles under eyes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	231	73.3	73.3	73.3
	Yes	25	7.9	7.9	81.3
	2	43	13.7	13.7	94.9
	3	16	5.1	5.1	100.0
	Total	315	100.0	100.0	

M. N. - Carpal Tunnel Syndrome?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	291	92.4	95.4	95.4
	Yes	14	4.4	4.6	100.0
	Total	305	96.8	100.0	
Missing	System	10	3.2		
Total		315	100.0		

M. N. - History of lower right abdominal pain?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	271	86.0	86.0	86.0
	Yes	34	10.8	10.8	96.8
	2	10	3.2	3.2	100.0
	Total	315	100.0	100.0	

M. N. - History of stress fractures?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	285	90.5	90.5	90.5
	Yes	14	4.4	4.4	94.9
	2	12	3.8	3.8	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

M. N. - Bone loss?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	295	93.7	93.7	93.7
	Yes	12	3.8	3.8	97.5
	2	4	1.3	1.3	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

M. N. - Are you shorter than you used to be?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	259	82.2	82.2	82.2
	Yes	56	17.8	17.8	100.0
	Total	315	100.0	100.0	

M. N. - Calf, foot or toe cramps at rest?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	214	67.9	67.9	67.9
	Yes	42	13.3	13.3	81.3
	2	19	6.0	6.0	87.3
	3	40	12.7	12.7	100.0
	Total	315	100.0	100.0	

M. N. - Cold sores, fever blisters or herpes lesions?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	245	77.8	77.8	77.8
	Yes	52	16.5	16.5	94.3
	2	14	4.4	4.4	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

M. N. - Frequent fevers?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	306	97.1	97.1	97.1
	Yes	9	2.9	2.9	100.0
	Total	315	100.0	100.0	

M. N. - Frequent skin rashes and/or hives?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	301	95.6	95.6	95.6
	2	10	3.2	3.2	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

M. N. - Have you ever had a herniated disc?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	302	95.9	97.1	97.1
	Yes	9	2.9	2.9	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Excessively flexible joints?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	295	93.7	94.9	94.9
	Yes	4	1.3	1.3	96.1
	2	4	1.3	1.3	97.4
	3	8	2.5	2.6	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Joints pop or click?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	244	77.5	78.5	78.5
	Yes	43	13.7	13.8	92.3
	3	24	7.6	7.7	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Pain or swelling in joints?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	266	84.4	85.5	85.5
	Yes	27	8.6	8.7	94.2
	2	14	4.4	4.5	98.7
	3	4	1.3	1.3	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Bursitis or tendonitis?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	271	86.0	87.1	87.1
	Yes	20	6.3	6.4	93.6
	2	10	3.2	3.2	96.8
	3	10	3.2	3.2	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - History of bone spurs?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	271	86.0	87.1	87.1
	Yes	34	10.8	10.9	98.1
	3	6	1.9	1.9	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Morning stiffness?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	233	74.0	74.9	74.9
	Yes	46	14.6	14.8	89.7
	2	4	1.3	1.3	91.0
	3	28	8.9	9.0	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Vomiting or nausea?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	239	75.9	76.8	76.8
	Yes	38	12.1	12.2	89.1
	3	34	10.8	10.9	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Crave chocolate?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	169	53.7	54.3	54.3
	Yes	49	15.6	15.8	70.1
	2	45	14.3	14.5	84.6
	3	48	15.2	15.4	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Feet have a strong odor?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	218	69.2	70.1	70.1
	Yes	73	23.2	23.5	93.6
	2	16	5.1	5.1	98.7
	3	4	1.3	1.3	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Tendency to anemia?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	267	84.8	85.9	85.9
	Yes	12	3.8	3.9	89.7
	2	4	1.3	1.3	91.0
	3	28	8.9	9.0	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Whites of eyes blue tinted?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	299	94.9	96.1	96.1
	Yes	8	2.5	2.6	98.7
	3	4	1.3	1.3	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Hoarseness?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	250	79.4	82.2	82.2
	Yes	30	9.5	9.9	92.1
	3	24	7.6	7.9	100.0
	Total	304	96.5	100.0	
Missing	System	11	3.5		
Total		315	100.0		

M. N. - Difficulty swallowing?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	252	80.0	83.4	83.4
	Yes	22	7.0	7.3	90.7
	2	4	1.3	1.3	92.1
	3	24	7.6	7.9	100.0
	Total	302	95.9	100.0	
Missing	System	13	4.1		
Total		315	100.0		

M. N. - Lump in throat?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	244	77.5	80.8	80.8
	Yes	28	8.9	9.3	90.1
	2	6	1.9	2.0	92.1
	3	24	7.6	7.9	100.0
	Total	302	95.9	100.0	
Missing	System	13	4.1		
Total		315	100.0		

M. N. - Dry mouth, eyes and/or nose?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	224	71.1	73.0	73.0
	Yes	40	12.7	13.0	86.0
	2	15	4.8	4.9	90.9
	3	28	8.9	9.1	100.0
	Total	307	97.5	100.0	
Missing	System	8	2.5		
Total		315	100.0		

M. N. - Gag easily?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	223	70.8	71.7	71.7
	Yes	32	10.2	10.3	82.0
	2	12	3.8	3.9	85.9
	3	44	14.0	14.1	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - White spots on fingernails?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	184	58.4	59.2	59.2
	Yes	67	21.3	21.5	80.7
	2	12	3.8	3.9	84.6
	3	48	15.2	15.4	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

M. N. - Cuts heal slowly and/or scar easily?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	214	67.9	70.9	70.9
	Yes	48	15.2	15.9	86.8
	2	4	1.3	1.3	88.1
	3	36	11.4	11.9	100.0
	Total	302	95.9	100.0	
Missing	System	13	4.1		
Total		315	100.0		

M. N. - Decreased sense of taste or smell?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	265	84.1	84.1	84.1
	Yes	12	3.8	3.8	87.9
	2	24	7.6	7.6	95.6
	3	14	4.4	4.4	100.0
	Total	315	100.0	100.0	

E. F. A. - Aspirin is an effective pain reliever?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	124	39.4	39.9	39.9
	Yes	181	57.5	58.2	98.1
	3	6	1.9	1.9	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

E. F. A. - Crave fatty or greasy foods?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	152	48.3	50.5	50.5
	Yes	86	27.3	28.6	79.1
	2	26	8.3	8.6	87.7
	3	37	11.7	12.3	100.0
	Total	301	95.6	100.0	
Missing	System	14	4.4		
Total		315	100.0		

E. F. A. - Low ore reduced fat diet (past or present)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	104	33.0	33.4	33.4
	Yes	114	36.2	36.7	70.1
	2	29	9.2	9.3	79.4
	3	64	20.3	20.6	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

E. F. A. - Tension headaches at base of skull?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	121	38.4	39.7	39.7
	Yes	90	28.6	29.5	69.2
	2	27	8.6	8.9	78.0
	3	67	21.3	22.0	100.0
	Total	305	96.8	100.0	
Missing	System	10	3.2		
Total		315	100.0		

E. F. A. - Headaches when out in the hot sun?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	124	39.4	39.9	39.9
	Yes	99	31.4	31.8	71.7
	2	39	12.4	12.5	84.2
	3	49	15.6	15.8	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

E. F. A. - Sunburn easily or suffer sun poisoning?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	204	64.8	65.6	65.6
	Yes	50	15.9	16.1	81.7
	2	16	5.1	5.1	86.8
	3	41	13.0	13.2	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

E. F. A. - Muscles easily fatigued?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	117	37.1	37.1	37.1
	Yes	101	32.1	32.1	69.2
	2	28	8.9	8.9	78.1
	3	69	21.9	21.9	100.0
	Total	315	100.0	100.0	

E. F. A. - Dry flaky skin and or dandruff?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	186	59.0	59.8	59.8
	Yes	46	14.6	14.8	74.6
	2	41	13.0	13.2	87.8
	3	38	12.1	12.2	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

S. H. - Awaken a few hours after falling asleep, hard to get back to steep?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	204	64.8	66.0	66.0
	Yes	49	15.6	15.9	81.9
	2	6	1.9	1.9	83.8
	3	50	15.9	16.2	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

S. H. - Crave sweets?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	45	14.3	14.5	14.5
	Yes	70	22.2	22.5	37.0
	2	43	13.7	13.8	50.8
	3	153	48.6	49.2	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

S. H. - Eat desserts or sugary snacks?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	88	27.9	27.9	27.9
	Yes	69	21.9	21.9	49.8
	2	30	9.5	9.5	59.4
	3	128	40.6	40.6	100.0
	Total	315	100.0	100.0	

S. H. - Binge or uncontrolled eating?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	134	42.5	43.1	43.1
	Yes	68	21.6	21.9	65.0
	2	54	17.1	17.4	82.3
	3	55	17.5	17.7	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

S. H. - Excessive appetite?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	110	34.9	36.5	36.5
	Yes	70	22.2	23.3	59.8
	2	58	18.4	19.3	79.1
	3	63	20.0	20.9	100.0
	Total	301	95.6	100.0	
Missing	System	14	4.4		
Total		315	100.0		

S. H. - Crave coffee or sugar in the afternoon?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	71	22.5	23.3	23.3
	Yes	77	24.4	25.2	48.5
	2	63	20.0	20.7	69.2
	3	94	29.8	30.8	100.0
	Total	305	96.8	100.0	
Missing	System	10	3.2		
Total		315	100.0		

S. H. - Sleepy in afternoon?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	73	23.2	23.5	23.5
	Yes	84	26.7	27.0	50.5
	2	71	22.5	22.8	73.3
	3	83	26.3	26.7	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

S. H. - Fatigue that is relieved by eating?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	139	44.1	44.1	44.1
	Yes	82	26.0	26.0	70.2
	2	29	9.2	9.2	79.4
	3	65	20.6	20.6	100.0
	Total	315	100.0	100.0	

S. H. - Headache if meals are skipped or delayed?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	105	33.3	33.8	33.8
	Yes	108	34.3	34.7	68.5
	2	45	14.3	14.5	83.0
	3	53	16.8	17.0	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

S. H. - Irritable before meals?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	198	62.9	64.7	64.7
	Yes	51	16.2	16.7	81.4
	2	7	2.2	2.3	83.7
	3	50	15.9	16.3	100.0
	Total	306	97.1	100.0	
Missing	System	9	2.9		
Total		315	100.0		

S. H. - Shaky if meals delayed?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	237	75.2	76.2	76.2
	Yes	26	8.3	8.4	84.6
	2	12	3.8	3.9	88.4
	3	36	11.4	11.6	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

S. H. - Family members with diabetes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	212	67.3	68.2	68.2
	2 or less	73	23.2	23.5	91.6
	2 to 4	26	8.3	8.4	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

S. H. - Frequent thirst?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	134	42.5	43.6	43.6
	Yes	75	23.8	24.4	68.1
	2	60	19.0	19.5	87.6
	3	38	12.1	12.4	100.0
	Total	307	97.5	100.0	
Missing	System	8	2.5		
Total		315	100.0		

S. H. - Frequent urination?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	157	49.8	53.0	53.0
	Yes	70	22.2	23.6	76.7
	2	20	6.3	6.8	83.4
	3	49	15.6	16.6	100.0
	Total	296	94.0	100.0	
Missing	System	19	6.0		
Total		315	100.0		

V. N. - Muscles become easily fatigued?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	111	35.2	35.2	35.2
	Yes	86	27.3	27.3	62.5
	2	35	11.1	11.1	73.7
	3	83	26.3	26.3	100.0
	Total	315	100.0	100.0	

V. N. - Feel worse, sore after moderate exercise?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	179	56.8	56.8	56.8
	Yes	41	13.0	13.0	69.8
	2	69	21.9	21.9	91.7
	3	26	8.3	8.3	100.0
	Total	315	100.0	100.0	

V. N. - Vulnerable to insect bites?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	194	61.6	62.6	62.6
	Yes	60	19.0	19.4	81.9
	2	42	13.3	13.5	95.5
	3	14	4.4	4.5	100.0
	Total	310	98.4	100.0	
Missing	System	5	1.6		
Total		315	100.0		

V. N. - Loss of muscle tone, heaviness in arms/legs?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	161	51.1	51.1	51.1
	Yes	90	28.6	28.6	79.7
	2	26	8.3	8.3	87.9
	3	38	12.1	12.1	100.0
	Total	315	100.0	100.0	

V. N. - Enlarged heart, or heart failure?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	293	93.0	94.8	94.8
	Yes	16	5.1	5.2	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

V. N. - Slow pulse (below 65)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	287	91.1	91.1	91.1
	Yes	28	8.9	8.9	100.0
	Total	315	100.0	100.0	

V. N. - Ringing in the ears/tinnitus?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	176	55.9	55.9	55.9
	Yes	93	29.5	29.5	85.4
	2	40	12.7	12.7	98.1
	3	6	1.9	1.9	100.0
	Total	315	100.0	100.0	

V. N. - Numbness, tingling or itching in extremities?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	174	55.2	55.2	55.2
	Yes	76	24.1	24.1	79.4
	2	48	15.2	15.2	94.6
	3	17	5.4	5.4	100.0
	Total	315	100.0	100.0	

V. N. - Depressed?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	195	61.9	61.9	61.9
	Yes	65	20.6	20.6	82.5
	2	19	6.0	6.0	88.6
	3	36	11.4	11.4	100.0
	Total	315	100.0	100.0	

V. N. - Fear of impending doom?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	190	60.3	62.3	62.3
	Yes	55	17.5	18.0	80.3
	2	48	15.2	15.7	96.1
	3	12	3.8	3.9	100.0
	Total	305	96.8	100.0	
Missing	System	10	3.2		
Total		315	100.0		

V. N. - Worrier, apprehensive, anxious?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	165	52.4	53.1	53.1
	Yes	84	26.7	27.0	80.1
	2	30	9.5	9.6	89.7
	3	32	10.2	10.3	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

V. N. - Nervous or agitated?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	138	43.8	43.8	43.8
	Yes	77	24.4	24.4	68.3
	2	82	26.0	26.0	94.3
	3	18	5.7	5.7	100.0
	Total	315	100.0	100.0	

V. N. - Feeling of insecurity?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	192	61.0	61.0	61.0
	Yes	48	15.2	15.2	76.2
	2	55	17.5	17.5	93.7
	3	16	5.1	5.1	98.7
	20	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

V. N. - Heart races?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	196	62.2	63.0	63.0
	Yes	72	22.9	23.2	86.2
	2	39	12.4	12.5	98.7
	3	4	1.3	1.3	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

V. N. - Can hear beat on pillow at night?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	202	64.1	64.1	64.1
	Yes	65	20.6	20.6	84.8
	2	48	15.2	15.2	100.0
	Total	315	100.0	100.0	

V. N. - Whole body or limb jerk as falling asleep?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	182	57.8	58.5	58.5
	Yes	47	14.9	15.1	73.6
	2	46	14.6	14.8	88.4
	3	36	11.4	11.6	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

V. N. - Night sweats?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	204	64.8	64.8	64.8
	Yes	33	10.5	10.5	75.2
	2	78	24.8	24.8	100.0
	Total	315	100.0	100.0	

V. N. - Restless leg syndrome?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	203	64.4	66.1	66.1
	Yes	68	21.6	22.1	88.3
	2	4	1.3	1.3	89.6
	3	32	10.2	10.4	100.0
	Total	307	97.5	100.0	
Missing	System	8	2.5		
Total		315	100.0		

V. N. - Cheilosis (cracks at corner of mouth)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	260	82.5	82.5	82.5
	Yes	20	6.3	6.3	88.9
	2	25	7.9	7.9	96.8
	3	10	3.2	3.2	100.0
	Total	315	100.0	100.0	

V. N. - Fragile skin, easily chaffed, as in shaving?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	214	67.9	67.9	67.9
	Yes	85	27.0	27.0	94.9
	2	10	3.2	3.2	98.1
	3	6	1.9	1.9	100.0
	Total	315	100.0	100.0	

V. N. - Polyps?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	280	88.9	91.2	91.2
	Yes	21	6.7	6.8	98.0
	3	6	1.9	2.0	100.0
	Total	307	97.5	100.0	
Missing	System	8	2.5		
Total		315	100.0		

V. N. - MSG sensitivity?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	242	76.8	78.8	78.8
	Yes	57	18.1	18.6	97.4
	3	8	2.5	2.6	100.0
	Total	307	97.5	100.0	
Missing	System	8	2.5		
Total		315	100.0		

V. N. - Wake up without remembering dreams?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	156	49.5	49.5	49.5
	Yes	109	34.6	34.6	84.1
	2	14	4.4	4.4	88.6
	3	36	11.4	11.4	100.0
	Total	315	100.0	100.0	

V. N. - Take birth control pills?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	284	90.2	90.2	90.2
	Yes	14	4.4	4.4	94.6
	2	6	1.9	1.9	96.5
	3	11	3.5	3.5	100.0
	Total	315	100.0	100.0	

V. N. - Small bumps on back of arms?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	246	78.1	79.1	79.1
	Yes	46	14.6	14.8	93.9
	2	19	6.0	6.1	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

V. N. - Strong light at night irritates eyes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	154	48.9	48.9	48.9
	Yes	52	16.5	16.5	65.4
	2	34	10.8	10.8	76.2
	3	75	23.8	23.8	100.0
	Total	315	100.0	100.0	

V. N. - Nose bleeds and /or tend to bruise easily?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	241	76.5	77.5	77.5
	Yes	22	7.0	7.1	84.6
	2	18	5.7	5.8	90.4
	3	30	9.5	9.6	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

V. N. - Bleeding gums especially when brushing teeth?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	160	50.8	51.8	51.8
	Yes	110	34.9	35.6	87.4
	3	39	12.4	12.6	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Tend to be a "night person"?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	201	63.8	65.0	65.0
	Yes	45	14.3	14.6	79.6
	2	30	9.5	9.7	89.3
	3	33	10.5	10.7	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Difficulty falling asleep?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	210	66.7	66.7	66.7
	Yes	53	16.8	16.8	83.5
	2	27	8.6	8.6	92.1
	3	25	7.9	7.9	100.0
	Total	315	100.0	100.0	

Adrenal - Slow starter in the morning?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	181	57.5	58.6	58.6
	Yes	68	21.6	22.0	80.6
	2	42	13.3	13.6	94.2
	3	18	5.7	5.8	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Keyed up, trouble calming down?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	162	51.4	51.4	51.4
	Yes	107	34.0	34.0	85.4
	2	35	11.1	11.1	96.5
	3	11	3.5	3.5	100.0
	Total	315	100.0	100.0	

Adrenal - High blood pressure?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	293	93.0	94.8	94.8
	Yes	12	3.8	3.9	98.7
	2	4	1.3	1.3	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Headache after exercising?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	254	80.6	80.6	80.6
	Yes	28	8.9	8.9	89.5
	2	29	9.2	9.2	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Adrenal - Feeling wired or jittery if drinking coffee?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	283	89.8	91.6	91.6
	Yes	22	7.0	7.1	98.7
	2	4	1.3	1.3	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Clench or grind teeth?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	269	85.4	86.5	86.5
	Yes	14	4.4	4.5	91.0
	2	28	8.9	9.0	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

Adrenal - Calm on the outside, troubled inside?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	154	48.9	48.9	48.9
	Yes	95	30.2	30.2	79.0
	2	25	7.9	7.9	87.0
	3	41	13.0	13.0	100.0
	Total	315	100.0	100.0	

Adrenal - Chronic low back pain, worse with fatigue?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	218	69.2	69.2	69.2
	Yes	22	7.0	7.0	76.2
	2	33	10.5	10.5	86.7
	3	42	13.3	13.3	100.0
	Total	315	100.0	100.0	

Adrenal - Become dizzy when standing up suddenly?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	186	59.0	59.0	59.0
	Yes	50	15.9	15.9	74.9
	2	67	21.3	21.3	96.2
	3	12	3.8	3.8	100.0
	Total	315	100.0	100.0	

Adrenal - Arthritic tendencies?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	261	82.9	83.9	83.9
	Yes	26	8.3	8.4	92.3
	2	24	7.6	7.7	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

Adrenal - Crave salty foods?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	191	60.6	60.6	60.6
	Yes	59	18.7	18.7	79.4
	2	38	12.1	12.1	91.4
	3	27	8.6	8.6	100.0
	Total	315	100.0	100.0	

Adrenal - Salt foods before tasting?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	262	83.2	84.8	84.8
	Yes	16	5.1	5.2	90.0
	2	6	1.9	1.9	91.9
	3	25	7.9	8.1	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Perspire easily?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	209	66.3	67.6	67.6
	Yes	50	15.9	16.2	83.8
	2	33	10.5	10.7	94.5
	3	17	5.4	5.5	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Chronic fatigues, or get drowsy often?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	209	66.3	67.6	67.6
	Yes	57	18.1	18.4	86.1
	3	43	13.7	13.9	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Afternoon yawning?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	147	46.7	46.7	46.7
	Yes	84	26.7	26.7	73.3
	2	29	9.2	9.2	82.5
	3	55	17.5	17.5	100.0
	Total	315	100.0	100.0	

Adrenal - Afternoon headache?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	201	63.8	63.8	63.8
	Yes	58	18.4	18.4	82.2
	2	12	3.8	3.8	86.0
	3	44	14.0	14.0	100.0
	Total	315	100.0	100.0	

Adrenal - Asthma, wheezing or difficulty breathing?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	278	88.3	90.0	90.0
	Yes	22	7.0	7.1	97.1
	2	4	1.3	1.3	98.4
	3	5	1.6	1.6	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Pain on the medial or inner side of the knee?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	239	75.9	77.3	77.3
	Yes	37	11.7	12.0	89.3
	2	9	2.9	2.9	92.2
	3	24	7.6	7.8	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Tendency to sprain ankles or "shin splints"?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	250	79.4	80.9	80.9
	Yes	12	3.8	3.9	84.8
	2	18	5.7	5.8	90.6
	3	29	9.2	9.4	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Tendency to need to wear sunglasses?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	161	51.1	52.1	52.1
	Yes	54	17.1	17.5	69.6
	2	24	7.6	7.8	77.3
	3	70	22.2	22.7	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Allergies and/or hives?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	269	85.4	87.1	87.1
	Yes	26	8.3	8.4	95.5
	2	8	2.5	2.6	98.1
	3	6	1.9	1.9	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Adrenal - Limitations, dizziness?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	200	63.5	63.5	63.5
	Yes	64	20.3	20.3	83.8
	2	8	2.5	2.5	86.3
	3	43	13.7	13.7	100.0
	Total	315	100.0	100.0	

Pituitary - Over 6' 6" tall?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	277	87.9	87.9	87.9
	Yes	38	12.1	12.1	100.0
	Total	315	100.0	100.0	

Pituitary - Early sexual development (before age 10)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	116	36.8	36.8	36.8
	Yes	199	63.2	63.2	100.0
	Total	315	100.0	100.0	

Pituitary - Increased libido?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	299	94.9	94.9	94.9
	Yes	6	1.9	1.9	96.8
	2	6	1.9	1.9	98.7
	3	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Pituitary - Splitting type headache?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	92	29.2	29.2	29.2
	Yes	46	14.6	14.6	43.8
	2	7	2.2	2.2	46.0
	3	170	54.0	54.0	100.0
	Total	315	100.0	100.0	

Pituitary - Memory failing?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	85	27.0	27.2	27.2
	Yes	36	11.4	11.5	38.7
	2	182	57.8	58.1	96.8
	3	10	3.2	3.2	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

Pituitary - Ability to tolerate sugar?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	128	40.6	40.6	40.6
	Yes	177	56.2	56.2	96.8
	2	4	1.3	1.3	98.1
	3	6	1.9	1.9	100.0
	Total	315	100.0	100.0	

Pituitary - Under 4' 10" tall?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	315	100.0	100.0	100.0

Pituitary - Decreased libido?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	293	93.0	93.0	93.0
	Yes	16	5.1	5.1	98.1
	2	4	1.3	1.3	99.4
	3	2	.6	.6	100.0
	Total	315	100.0	100.0	

Pituitary - Abnormal thirst?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	299	94.9	94.9	94.9
	Yes	12	3.8	3.8	98.7
	2	3	1.0	1.0	99.7
	3	1	.3	.3	100.0
	Total	315	100.0	100.0	

Pituitary - Weight gain around hips or waist?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	72	22.9	22.9	22.9
	Yes	50	15.9	15.9	38.7
	2	4	1.3	1.3	40.0
	3	189	60.0	60.0	100.0
	Total	315	100.0	100.0	

Pituitary - Menstrual disorders?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	120	38.1	38.1	38.1
	Yes	177	56.2	56.2	94.3
	2	4	1.3	1.3	95.6
	3	14	4.4	4.4	100.0
	Total	315	100.0	100.0	

Pituitary - Delayed (after age 13) sexual development?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	305	96.8	96.8	96.8
	Yes	6	1.9	1.9	98.7
	2	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Pituitary - Tendency to ulcers or colitis?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	148	47.0	47.0	47.0
	2	167	53.0	53.0	100.0
	Total	315	100.0	100.0	

Thyroid - Allergic to iodine?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	311	98.7	98.7	98.7
	Yes	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Thyroid - Difficulty gaining weight, even with large appetite?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	299	94.9	94.9	94.9
	Yes	14	4.4	4.4	99.4
	3	2	.6	.6	100.0
	Total	315	100.0	100.0	

Thyroid - Nervous, emotional, can't work under pressure?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	107	34.0	34.0	34.0
	Yes	16	5.1	5.1	39.0
	2	18	5.7	5.7	44.8
	3	174	55.2	55.2	100.0
	Total	315	100.0	100.0	

Thyroid - Inward trembling?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	143	45.4	45.4	45.4
	Yes	7	2.2	2.2	47.6
	2	2	.6	.6	48.3
	3	163	51.7	51.7	100.0
	Total	315	100.0	100.0	

Thyroid - Flush easily?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	132	41.9	41.9	41.9
	Yes	14	4.4	4.4	46.3
	2	4	1.3	1.3	47.6
	3	165	52.4	52.4	100.0
	Total	315	100.0	100.0	

Thyroid - Fast pulse at rest?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	139	44.1	44.4	44.4
	Yes	6	1.9	1.9	46.3
	2	164	52.1	52.4	98.7
	3	4	1.3	1.3	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

Thyroid - Intolerance to high temperatures?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	281	89.2	89.2	89.2
	Yes	18	5.7	5.7	94.9
	2	4	1.3	1.3	96.2
	3	12	3.8	3.8	100.0
	Total	315	100.0	100.0	

Thyroid - Difficulty losing weight?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	104	33.0	33.2	33.2
	Yes	24	7.6	7.7	40.9
	2	5	1.6	1.6	42.5
	3	180	57.1	57.5	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

Thyroid - Mentally sluggish, reduced initiative?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	303	96.2	96.2	96.2
	Yes	10	3.2	3.2	99.4
	2	2	.6	.6	100.0
	Total	315	100.0	100.0	

Thyroid - Easily fatigued, sleepy during the day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	111	35.2	35.2	35.2
	Yes	24	7.6	7.6	42.9
	2	7	2.2	2.2	45.1
	3	173	54.9	54.9	100.0
	Total	315	100.0	100.0	

Thyroid - Sensitive to cold, poor circulation (cold hands and feet)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	105	33.3	33.3	33.3
	Yes	18	5.7	5.7	39.0
	2	14	4.4	4.4	43.5
	3	178	56.5	56.5	100.0
	Total	315	100.0	100.0	

Thyroid - Constipation (chronic)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	144	45.7	45.7	45.7
	Yes	2	.6	.6	46.3
	2	163	51.7	51.7	98.1
	3	6	1.9	1.9	100.0
	Total	315	100.0	100.0	

Thyroid - Excessive hair loss and/or coarse hair?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	128	40.6	40.9	40.9
	Yes	10	3.2	3.2	44.1
	2	169	53.7	54.0	98.1
	3	6	1.9	1.9	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

Thyroid - Morning headaches, wear off during the day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	131	41.6	41.6	41.6
	Yes	16	5.1	5.1	46.7
	2	1	.3	.3	47.0
	3	167	53.0	53.0	100.0
	Total	315	100.0	100.0	

Thyroid - Loss of lateral 1/3 of eyebrow?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	143	45.4	45.4	45.4
	Yes	5	1.6	1.6	47.0
	2	2	.6	.6	47.6
	3	165	52.4	52.4	100.0
	Total	315	100.0	100.0	

Thyroid - Seasonal sadness?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	124	39.4	39.4	39.4
	Yes	18	5.7	5.7	45.1
	2	171	54.3	54.3	99.4
	3	2	.6	.6	100.0
	Total	315	100.0	100.0	

Men only - Prostate problems?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	315	100.0	100.0	100.0

Men only - Urination difficult or dribbling?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	296	94.0	94.0	94.0
	Yes	17	5.4	5.4	99.4
	3	2	.6	.6	100.0
	Total	315	100.0	100.0	

Men only - Difficult to start and stop urine stream?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	314	99.7	99.7	99.7
	Yes	1	.3	.3	100.0
	Total	315	100.0	100.0	

Men only - Pain or burning during urination?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	312	99.0	99.0	99.0
	Yes	3	1.0	1.0	100.0
	Total	315	100.0	100.0	

Men only - Wake up to urinate in the night?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	94	29.8	29.8	29.8
	Yes	195	61.9	61.9	91.7
	2	16	5.1	5.1	96.8
	3	10	3.2	3.2	100.0
	Total	315	100.0	100.0	

Men only - Interruption of stream during urination?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	301	95.6	95.6	95.6
	Yes	14	4.4	4.4	100.0
	Total	315	100.0	100.0	

Men only - Pain on inside of legs and heels?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	310	98.4	98.4	98.4
	Yes	5	1.6	1.6	100.0
	Total	315	100.0	100.0	

Men only - Feeling of incomplete bowel evacuation?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	305	96.8	96.8	96.8
	Yes	10	3.2	3.2	100.0
	Total	315	100.0	100.0	

Men only - Decreased sexual function?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	307	97.5	97.5	97.5
	Yes	4	1.3	1.3	98.7
	2	4	1.3	1.3	100.0
	Total	315	100.0	100.0	

Women only - Depression during periods?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	55	17.5	18.5	18.5
	Yes	22	7.0	7.4	25.9
	2	14	4.4	4.7	30.6
	3	206	65.4	69.4	100.0
	Total	297	94.3	100.0	
Missing	System	18	5.7		
Total		315	100.0		

Women only - Mood swings associated with periods (PMS)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	53	16.8	17.8	17.8
	Yes	20	6.3	6.7	24.6
	2	20	6.3	6.7	31.3
	3	204	64.8	68.7	100.0
	Total	297	94.3	100.0	
Missing	System	18	5.7		
Total		315	100.0		

Women only - Crave chocolate around periods?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	27	8.6	9.0	9.0
	Yes	30	9.5	10.0	18.9
	2	16	5.1	5.3	24.3
	3	228	72.4	75.7	100.0
	Total	301	95.6	100.0	
Missing	System	14	4.4		
Total		315	100.0		

Women only - Breast associated with cycle?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	24	7.6	8.0	8.0
	Yes	38	12.1	12.7	20.7
	2	11	3.5	3.7	24.4
	3	226	71.7	75.6	100.0
	Total	299	94.9	100.0	
Missing	System	16	5.1		
Total		315	100.0		

Women only - Excessive menstrual flow?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	55	17.5	18.4	18.4
	Yes	208	66.0	69.6	88.0
	2	16	5.1	5.4	93.3
	3	20	6.3	6.7	100.0
	Total	299	94.9	100.0	
Missing	System	16	5.1		
Total		315	100.0		

Women only - Scanty blood flow during periods?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	83	26.3	27.9	27.9
	Yes	8	2.5	2.7	30.6
	2	16	5.1	5.4	36.0
	3	190	60.3	64.0	100.0
	Total	297	94.3	100.0	
Missing	System	18	5.7		
Total		315	100.0		

Women only - Occasional skipped periods?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	263	83.5	89.8	89.8
	Yes	8	2.5	2.7	92.5
	2	4	1.3	1.4	93.9
	3	18	5.7	6.1	100.0
	Total	293	93.0	100.0	
Missing	System	22	7.0		
Total		315	100.0		

Women only - Variations in menstrual cycles?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	259	82.2	87.8	87.8
	Yes	14	4.4	4.7	92.5
	2	6	1.9	2.0	94.6
	3	16	5.1	5.4	100.0
	Total	295	93.7	100.0	
Missing	System	20	6.3		
Total		315	100.0		

Women only - Endometriosis?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	283	89.8	95.9	95.9
	Yes	10	3.2	3.4	99.3
	2	2	.6	.7	100.0
	Total	295	93.7	100.0	
Missing	System	20	6.3		
Total		315	100.0		

Women only - Uterine fibroids?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	285	90.5	96.6	96.6
	2	4	1.3	1.4	98.0
	3	6	1.9	2.0	100.0
	Total	295	93.7	100.0	
Missing	System	20	6.3		
Total		315	100.0		

Women only - Breast fibroids?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	285	90.5	99.3	99.3
	2	2	.6	.7	100.0
	Total	287	91.1	100.0	
Missing	System	28	8.9		
Total		315	100.0		

Women only - Painful intercourse?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	83	26.3	29.1	29.1
	Yes	198	62.9	69.5	98.6
	2	2	.6	.7	99.3
	3	2	.6	.7	100.0
	Total	285	90.5	100.0	
Missing	System	30	9.5		
Total		315	100.0		

Women only - Vaginal discharge?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	83	26.3	28.7	28.7
	Yes	12	3.8	4.2	32.9
	2	4	1.3	1.4	34.3
	3	190	60.3	65.7	100.0
	Total	289	91.7	100.0	
Missing	System	26	8.3		
Total		315	100.0		

Women only - Vaginal dryness?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	83	26.3	28.7	28.7
	Yes	14	4.4	4.8	33.6
	2	192	61.0	66.4	100.0
	Total	289	91.7	100.0	
Missing	System	26	8.3		
Total		315	100.0		

Women only - Vaginal itchiness?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	69	21.9	23.9	23.9
	Yes	26	8.3	9.0	32.9
	2	2	.6	.7	33.6
	3	192	61.0	66.4	100.0
	Total	289	91.7	100.0	
Missing	System	26	8.3		
Total		315	100.0		

Women only - Gain weight around hips, thighs and buttocks?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	77	24.4	26.3	26.3
	Yes	14	4.4	4.8	31.1
	3	202	64.1	68.9	100.0
	Total	293	93.0	100.0	
Missing	System	22	7.0		
Total		315	100.0		

Women only - Excess facial or body hair?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	265	84.1	89.8	89.8
	Yes	16	5.1	5.4	95.3
	2	10	3.2	3.4	98.6
	3	4	1.3	1.4	100.0
	Total	295	93.7	100.0	
Missing	System	20	6.3		
Total		315	100.0		

Women only - Hot flashes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	51	16.2	17.5	17.5
	Yes	22	7.0	7.6	25.1
	2	14	4.4	4.8	29.9
	3	204	64.8	70.1	100.0
	Total	291	92.4	100.0	
Missing	System	24	7.6		
Total		315	100.0		

Women only - Night sweats?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	77	24.4	26.6	26.6
	Yes	12	3.8	4.2	30.8
	3	200	63.5	69.2	100.0
	Total	289	91.7	100.0	
Missing	System	26	8.3		
Total		315	100.0		

Women only - Thinning skin?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	83	26.3	28.5	28.5
	Yes	16	5.1	5.5	34.0
	2	190	60.3	65.3	99.3
	3	2	.6	.7	100.0
	Total	291	92.4	100.0	
Missing	System	24	7.6		
Total		315	100.0		

Cardiovascular - Aware of heavy and/or irregular breathing?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	131	41.6	43.4	43.4
	Yes	169	53.7	56.0	99.3
	2	2	.6	.7	100.0
	Total	302	95.9	100.0	
Missing	System	13	4.1		
Total		315	100.0		

Cardiovascular - Discomfort at high altitudes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	129	41.0	42.2	42.2
	Yes	169	53.7	55.2	97.4
	2	8	2.5	2.6	100.0
	Total	306	97.1	100.0	
Missing	System	9	2.9		
Total		315	100.0		

Cardiovascular - "Air hunger" and/or yawn frequently?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	86	27.3	27.9	27.9
	Yes	49	15.6	15.9	43.8
	2	4	1.3	1.3	45.1
	3	169	53.7	54.9	100.0
	Total	308	97.8	100.0	
Missing	System	7	2.2		
Total		315	100.0		

Cardiovascular - Compelled to open windows in a closed room?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	82	26.0	26.8	26.8
	Yes	54	17.1	17.6	44.4
	2	5	1.6	1.6	46.1
	3	165	52.4	53.9	100.0
	Total	306	97.1	100.0	
Missing	System	9	2.9		
Total		315	100.0		

Cardiovascular - Shortness of breath with moderate exertion?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	119	37.8	39.7	39.7
	Yes	12	3.8	4.0	43.7
	2	165	52.4	55.0	98.7
	3	4	1.3	1.3	100.0
	Total	300	95.2	100.0	
Missing	System	15	4.8		
Total		315	100.0		

Cardiovascular - Ankles swell, especially at end of day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	117	37.1	38.7	38.7
	Yes	20	6.3	6.6	45.4
	2	2	.6	.7	46.0
	3	163	51.7	54.0	100.0
	Total	302	95.9	100.0	
Missing	System	13	4.1		
Total		315	100.0		

Cardiovascular - Cough at night?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	126	40.0	41.2	41.2
	Yes	12	3.8	3.9	45.1
	2	3	1.0	1.0	46.1
	3	165	52.4	53.9	100.0
	Total	306	97.1	100.0	
Missing	System	9	2.9		
Total		315	100.0		

Cardiovascular - Blush or face turns red for no reason?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	130	41.3	42.8	42.8
	Yes	6	1.9	2.0	44.7
	2	3	1.0	1.0	45.7
	3	165	52.4	54.3	100.0
	Total	304	96.5	100.0	
Missing	System	11	3.5		
Total		315	100.0		

Cardiovascular - Dull pain or tightness in chest and/or radiate into right arm, worse with exertion?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	124	39.4	40.8	40.8
	Yes	9	2.9	3.0	43.8
	2	6	1.9	2.0	45.7
	3	165	52.4	54.3	100.0
	Total	304	96.5	100.0	
Missing	System	11	3.5		
Total		315	100.0		

Cardiovascular - Muscle cramps with exertion?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	115	36.5	38.3	38.3
	Yes	16	5.1	5.3	43.7
	2	4	1.3	1.3	45.0
	3	165	52.4	55.0	100.0
	Total	300	95.2	100.0	
Missing	System	15	4.8		
Total		315	100.0		

Kidney & Bladder - Pain in mid back region?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	85	27.0	28.1	28.1
	Yes	46	14.6	15.2	43.2
	2	7	2.2	2.3	45.5
	3	165	52.4	54.5	100.0
	Total	303	96.2	100.0	
Missing	System	12	3.8		
Total		315	100.0		

Kidney & Bladder - Dark circles under eyes and/or puffy eyes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	91	28.9	29.6	29.6
	Yes	42	13.3	13.7	43.3
	2	168	53.3	54.7	98.0
	3	6	1.9	2.0	100.0
	Total	307	97.5	100.0	
Missing	System	8	2.5		
Total		315	100.0		

Kidney & Bladder - History of kidney stones?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	130	41.3	42.9	42.9
	Yes	173	54.9	57.1	100.0
	Total	303	96.2	100.0	
Missing	System	12	3.8		
Total		315	100.0		

Kidney & Bladder - Cloudy, bloody or darkened urine?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	98	31.1	32.3	32.3
	Yes	42	13.3	13.9	46.2
	2	163	51.7	53.8	100.0
	Total	303	96.2	100.0	
Missing	System	12	3.8		
Total		315	100.0		

Kidney & Bladder - Urine has a strong odor?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	124	39.4	40.7	40.7
	Yes	177	56.2	58.0	98.7
	2	4	1.3	1.3	100.0
	Total	305	96.8	100.0	
Missing	System	10	3.2		
Total		315	100.0		

Runny or drippy nose?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	121	38.4	40.2	40.2
	Yes	12	3.8	4.0	44.2
	2	5	1.6	1.7	45.8
	3	163	51.7	54.2	100.0
	Total	301	95.6	100.0	
Missing	System	14	4.4		
Total		315	100.0		

Catch colds at the beginning of winter?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	116	36.8	38.0	38.0
	Yes	16	5.1	5.2	43.3
	2	10	3.2	3.3	46.6
	3	163	51.7	53.4	100.0
	Total	305	96.8	100.0	
Missing	System	10	3.2		
Total		315	100.0		

Mucus producing cough?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	121	38.4	40.2	40.2
	Yes	10	3.2	3.3	43.5
	2	7	2.2	2.3	45.8
	3	163	51.7	54.2	100.0
	Total	301	95.6	100.0	
Missing	System	14	4.4		
Total		315	100.0		

Frequent infections?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	124	39.4	40.9	40.9
	Yes	173	54.9	57.1	98.0
	2	6	1.9	2.0	100.0
	Total	303	96.2	100.0	
Missing	System	12	3.8		
Total		315	100.0		

Frequent colds or flu?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	116	36.8	38.3	38.3
	Yes	20	6.3	6.6	44.9
	2	165	52.4	54.5	99.3
	3	2	.6	.7	100.0
	Total	303	96.2	100.0	
Missing	System	12	3.8		
Total		315	100.0		

Never get sick

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	231	73.3	78.0	78.0
	Not in the last 2 years	27	8.6	9.1	87.2
	Not in the last 4 years	4	1.3	1.4	88.5
	Not in the last 7 years	34	10.8	11.5	100.0
	Total	296	94.0	100.0	
Missing	System	19	6.0		
Total		315	100.0		

Acne (adult)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	272	86.3	91.0	91.0
	Yes	15	4.8	5.0	96.0
	2	8	2.5	2.7	98.7
	3	4	1.3	1.3	100.0
	Total	299	94.9	100.0	
Missing	System	16	5.1		
Total		315	100.0		

Itchy skin/dermatitis?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	290	92.1	95.7	95.7
	Yes	11	3.5	3.6	99.3
	2	2	.6	.7	100.0
	Total	303	96.2	100.0	
Missing	System	12	3.8		
Total		315	100.0		

Cysts, boils, rashes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	114	36.2	38.1	38.1
	Yes	179	56.8	59.9	98.0
	2	6	1.9	2.0	100.0
	Total	299	94.9	100.0	
Missing	System	16	5.1		
Total		315	100.0		

How much low fat or skim milk yogurt and cheese do you consume in a week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	At least 480 g. milk or yogurt or 90 g. cheese per week	261	82.9	83.4	83.4
	240 g. milk or yogurt or 30 g. cheese per week	25	7.9	8.0	91.4
	Only use it in cereal or consume it occasionally	25	7.9	8.0	99.4
	Do not consume milk, yogurt or cheese	2	.6	.6	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

How often do you choose to eat potato chips, corn chips, olives or similar foods as snacks or with a meal?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None or rarely	130	41.3	41.5	41.5
	Occasionally (1-2 times per week)	125	39.7	39.9	81.5
	3-4 times per week	48	15.2	15.3	96.8
	5 or more times per week	10	3.2	3.2	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

How many servings of fruit do you eat per day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7 or more	38	12.1	12.1	12.1
	4-6 times	34	10.8	10.8	22.9
	1-3 times	181	57.5	57.5	80.3
	None	62	19.7	19.7	100.0
	Total	315	100.0	100.0	

How many servings of whole grain breads and cereals and bran products do you eat each day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More than 4	85	27.0	27.0	27.0
	3-4 servings	52	16.5	16.5	43.5
	1-2 servings	121	38.4	38.4	81.9
	None	57	18.1	18.1	100.0
	Total	315	100.0	100.0	

Describe your consumption of vegetables:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Snack on raw vegetables and eat vegetables/salads with lunch and dinner	103	32.7	32.7	32.7
	Eat salads and vegetables at one meal a day	105	33.3	33.3	66.0
	Eat vegetables 2-3 times per week	65	20.6	20.6	86.7
	Rarely eat vegetables	42	13.3	13.3	100.0
	Total	315	100.0	100.0	

How many glasses of water do you drink in a day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nine and more	149	47.3	47.3	47.3
	5-8 glasses	43	13.7	13.7	61.0
	2-4 glasses	32	10.2	10.2	71.1
	1 glass or none	91	28.9	28.9	100.0
	Total	315	100.0	100.0	

Which most closely describes the amount of food you eat at one time?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Select a reasonable portion and stop eating when full	76	24.1	24.1	24.1
	Eat what is served and clean the plate	126	40.0	40.0	64.1
	Eat additional helpings	78	24.8	24.8	88.9
	Eat until full and then eat desserts	35	11.1	11.1	100.0
	Total	315	100.0	100.0	

If you wanted to decrease caloric intake, which would you do?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cut down on meat, cream sauces, gravy, desserts, salad dressings ...	96	30.5	30.7	30.7
	Limit portion sizes	138	43.8	44.1	74.8
	Leave off bread and potatoes	57	18.1	18.2	93.0
	Follow a crash diet for a few days	22	7.0	7.0	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

How many alcoholic beverages do you consume?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely or never drink	132	41.9	41.9	41.9
	1-3 drinks per week	95	30.2	30.2	72.1
	1-2 drinks per day	32	10.2	10.2	82.2
	3 or more drinks on weekends	56	17.8	17.8	100.0
	Total	315	100.0	100.0	

Do you ever eat until you are so full that you are uncomfortable?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely or on special occasions	179	56.8	56.8	56.8
	1-2 times a month	53	16.8	16.8	73.7
	Once a week	46	14.6	14.6	88.3
	Every couple of days, or more	37	11.7	11.7	100.0
	Total	315	100.0	100.0	

How many sweets do you eat?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Only on special occasions or do not eat sweets	148	47.0	48.5	48.5
	1-2 servings per day	81	25.7	26.6	75.1
	3-4 servings per day	36	11.4	11.8	86.9
	5 or more servings per day	40	12.7	13.1	100.0
	Total	305	96.8	100.0	
Missing	System	10	3.2		
Total		315	100.0		

Which pattern of eating typifies your style?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Regular meals at frequent intervals	111	35.2	35.2	35.2
	Occasionally skipping a meal	84	26.7	26.7	61.9
	Skipping breakfast or lunch	47	14.9	14.9	76.8
	Skipping meals during the day and eating only the evening	73	23.2	23.2	100.0
	Total	315	100.0	100.0	

How often do you eat eggs for breakfast or another meal?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Once per week or none	200	63.5	63.9	63.9
	2-3 times per week	36	11.4	11.5	75.4
	4-6 times per week	73	23.2	23.3	98.7
	7 or more times per week	4	1.3	1.3	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

How many times per week do you consume red meat?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume red meat	225	71.4	71.9	71.9
	Less than 2 times	61	19.4	19.5	91.4
	3-4 times	23	7.3	7.3	98.7
	More than 5-6 times	4	1.3	1.3	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

When you prepare or eat poultry which of the following do you most closely follow?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Choose white meat, remove skin and bake or broil	94	29.8	30.2	30.2
	Choose dark meat, remove skin and bake or broil	67	21.3	21.5	51.8
	3	48	15.2	15.4	67.2
	4	42	13.3	13.5	80.7
	5	60	19.0	19.3	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

When selecting a salad or sandwich, which of the following "fillings" do you usually choose?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low fat cheese	106	33.7	34.3	34.3
	Turkey, chicken, tuna, lean cuts of meats	70	22.2	22.7	57.0
	Same as above with cheese	83	26.3	26.9	83.8
	Ham, pastrami, hamburger, salami, sausages, bacon with cream or hard cheese	50	15.9	16.2	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

When you eat dairy products. You select:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Only skim or 0.5% fat	74	23.5	24.1	24.1
	Low fat products (1-2% fat)	186	59.0	60.6	84.7
	Regular ice cream and yogurt but use low fat milk	35	11.1	11.4	96.1
	Whole fat	12	3.8	3.9	100.0
	Total	307	97.5	100.0	
Missing	System	8	2.5		
Total		315	100.0		

How do you prefer your potatoes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Boiled or baked with no added fat	134	42.5	43.1	43.1
	Boiled or baked with margarine/yogurt	56	17.8	18.0	61.1
	Boiled or baked with margarine/butter and sour cream	72	22.9	23.2	84.2
	French fries, hash browns	49	15.6	15.8	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

How frequently do you add salt to your food after it is served at the table?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	140	44.4	44.4	44.4
	1-2 times per week	90	28.6	28.6	73.0
	About once a week	41	13.0	13.0	86.0
	With almost all meals	44	14.0	14.0	100.0
	Total	315	100.0	100.0	

How many times do you eat at a "fast food" restaurant?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely and always select from the salad bar	137	43.5	43.5	43.5
	Once a week	112	35.6	35.6	79.0
	2-3 times a week	49	15.6	15.6	94.6
	4 or more times a week	17	5.4	5.4	100.0
	Total	315	100.0	100.0	

How often do you eat any of the following foods (hot dogs, luncheon meat, bacon, ham, sausage, loutza, roast beef)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely or never	180	57.1	57.1	57.1
	1-2 times per week	121	38.4	38.4	95.6
	3-4 times per week	6	1.9	1.9	97.5
	Daily	8	2.5	2.5	100.0
	Total	315	100.0	100.0	

In what form do you most frequently purchase food or meal preparations?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fresh	224	71.1	71.6	71.6
	Canned or frozen without salt	42	13.3	13.4	85.0
	Canned without sauces	13	4.1	4.2	89.1
	Canned, frozen or dry with sauces and/or seasonings	34	10.8	10.9	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

While preparing meals or when eating out, how frequently do you add any or all of the following items to your food (mustard, pickles, relish, soy sauce, ketchup, meat tenderizer, MSG?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely or never	132	41.9	42.7	42.7
	1-2 times per week	96	30.5	31.1	73.8
	3-4 times per week	66	21.0	21.4	95.1
	Daily	15	4.8	4.9	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Scoring results - Excellent (6-8 points)

		Frequency	Percent
Missing	System	315	100.0

Scoring results - Good (9-12 points)

		Frequency	Percent
Missing	System	315	100.0

Scoring results - Fair (13-16 points)

		Frequency	Percent
Missing	System	315	100.0

Scoring results - Poor (17-20 points)

		Frequency	Percent
Missing	System	315	100.0

Scoring results - Very poor (21-24 points)

		Frequency	Percent
Missing	System	315	100.0

Score of prudent diet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10	144	45.7	79.6	79.6
	11	2	.6	1.1	80.7
	13	8	2.5	4.4	85.1
	14	6	1.9	3.3	88.4
	15	7	2.2	3.9	92.3
	16	6	1.9	3.3	95.6
	17	2	.6	1.1	96.7
	18	2	.6	1.1	97.8
	20	2	.6	1.1	98.9
	22	2	.6	1.1	100.0
	Total	181	57.5	100.0	
Missing	System	134	42.5		
Total		315	100.0		

Score of calorie control

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6	146	46.3	80.7	80.7
	7	2	.6	1.1	81.8
	8	4	1.3	2.2	84.0
	9	4	1.3	2.2	86.2
	10	8	2.5	4.4	90.6
	11	2	.6	1.1	91.7
	12	2	.6	1.1	92.8
	13	1	.3	.6	93.4
	14	6	1.9	3.3	96.7
	15	2	.6	1.1	97.8
	17	2	.6	1.1	98.9
	19	2	.6	1.1	100.0
	Total	181	57.5	100.0	
Missing	System	134	42.5		
Total		315	100.0		

Score of fat control

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6	146	46.3	80.7	80.7
	8	2	.6	1.1	81.8
	9	6	1.9	3.3	85.1
	11	9	2.9	5.0	90.1
	12	6	1.9	3.3	93.4
	13	4	1.3	2.2	95.6
	14	2	.6	1.1	96.7
	16	6	1.9	3.3	100.0
	Total	181	57.5	100.0	
Missing	System	134	42.5		
Total		315	100.0		

Score of sodium/salt control

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	154	48.9	85.1	85.1
	6	6	1.9	3.3	88.4
	7	3	1.0	1.7	90.1
	8	4	1.3	2.2	92.3
	9	6	1.9	3.3	95.6
	10	2	.6	1.1	96.7
	11	4	1.3	2.2	98.9
	13	2	.6	1.1	100.0
	Total	181	57.5	100.0	
Missing	System	134	42.5		
Total		315	100.0		

How much low fat or skim milk yogurt and cheese do you consume in a week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	At least 480 g. milk or yogurt or 90 g. cheese per week	261	82.9	83.4	83.4
	240 g. milk or yogurt or 30 g. cheese per week	25	7.9	8.0	91.4
	Only use it in cereal or consume it occasionally	25	7.9	8.0	99.4
	Do not consume milk, yogurt or cheese	2	.6	.6	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

How often do you choose to eat potato chips, corn chips, olives or similar foods as snacks or with a meal?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None or rarely	130	41.3	41.5	41.5
	Occasionally (1-2 times per week)	125	39.7	39.9	81.5
	3-4 times per week	48	15.2	15.3	96.8
	5 or more times per week	10	3.2	3.2	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

How many servings of fruit do you eat per day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7 or more	38	12.1	12.1	12.1
	4-6 times	34	10.8	10.8	22.9
	1-3 times	181	57.5	57.5	80.3
	None	62	19.7	19.7	100.0
	Total	315	100.0	100.0	

How many servings of whole grain breads and cereals and bran products do you eat each day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More than 4	85	27.0	27.0	27.0
	3-4 servings	52	16.5	16.5	43.5
	1-2 servings	121	38.4	38.4	81.9
	None	57	18.1	18.1	100.0
	Total	315	100.0	100.0	

Describe your consumption of vegetables:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Snack on raw vegetables and eat vegetables/salads with lunch and dinner	103	32.7	32.7	32.7
	Eat salads and vegetables at one meal a day	105	33.3	33.3	66.0
	Eat vegetables 2-3 times per week	65	20.6	20.6	86.7
	Rarely eat vegetables	42	13.3	13.3	100.0
	Total	315	100.0	100.0	

How many glasses of water do you drink in a day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nine and more	149	47.3	47.3	47.3
	5-8 glasses	43	13.7	13.7	61.0
	2-4 glasses	32	10.2	10.2	71.1
	1 glass or none	91	28.9	28.9	100.0
	Total	315	100.0	100.0	

Which most closely describes the amount of food you eat at one time?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Select a reasonable portion and stop eating when full	76	24.1	24.1	24.1
	Eat what is served and clean the plate	126	40.0	40.0	64.1
	Eat additional helpings	78	24.8	24.8	88.9
	Eat until full and then eat desserts	35	11.1	11.1	100.0
	Total	315	100.0	100.0	

If you wanted to decrease caloric intake, which would you do?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cut down on meat, cream sauces, gravy, desserts, salad dressings ...	96	30.5	30.7	30.7
	Limit portion sizes	138	43.8	44.1	74.8
	Leave off bread and potatoes	57	18.1	18.2	93.0
	Follow a crash diet for a few days	22	7.0	7.0	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

How many alcoholic beverages do you consume?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely or never drink	132	41.9	41.9	41.9
	1-3 drinks per week	95	30.2	30.2	72.1
	1-2 drinks per day	32	10.2	10.2	82.2
	3 or more drinks on weekends	56	17.8	17.8	100.0
	Total	315	100.0	100.0	

Do you ever eat until you are so full that you are uncomfortable?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely or on special occasions	179	56.8	56.8	56.8
	1-2 times a month	53	16.8	16.8	73.7
	Once a week	46	14.6	14.6	88.3
	Every couple of days, or more	37	11.7	11.7	100.0
	Total	315	100.0	100.0	

How many sweets do you eat?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Only on special occasions or do not eat sweets	148	47.0	48.5	48.5
	1-2 servings per day	81	25.7	26.6	75.1
	3-4 servings per day	36	11.4	11.8	86.9
	5 or more servings per day	40	12.7	13.1	100.0
	Total	305	96.8	100.0	
Missing	System	10	3.2		
Total		315	100.0		

Which pattern of eating typifies your style?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Regular meals at frequent intervals	111	35.2	35.2	35.2
	Occasionally skipping a meal	84	26.7	26.7	61.9
	Skipping breakfast or lunch	47	14.9	14.9	76.8
	Skipping meals during the day and eating only the evening	73	23.2	23.2	100.0
	Total	315	100.0	100.0	

How often do you eat eggs for breakfast or another meal?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Once per week or none	200	63.5	63.9	63.9
	2-3 times per week	36	11.4	11.5	75.4
	4-6 times per week	73	23.2	23.3	98.7
	7 or more times per week	4	1.3	1.3	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

How many times per week do you consume red meat?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not consume red meat	225	71.4	71.9	71.9
	Less than 2 times	61	19.4	19.5	91.4
	3-4 times	23	7.3	7.3	98.7
	More than 5-6 times	4	1.3	1.3	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

When you prepare or eat poultry which of the following do you most closely follow?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Choose white meat, remove skin and bake or broil	94	29.8	30.2	30.2
	Choose dark meat, remove skin and bake or broil	67	21.3	21.5	51.8
	3	48	15.2	15.4	67.2
	4	42	13.3	13.5	80.7
	5	60	19.0	19.3	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

When selecting a salad or sandwich, which of the following "fillings" do you usually choose?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low fat cheese	106	33.7	34.3	34.3
	Turkey, chicken, tuna, lean cuts of meats	70	22.2	22.7	57.0
	Same as above with cheese	83	26.3	26.9	83.8
	Ham, pastrami, hamburger, salami, sausages, bacon with cream or hard cheese	50	15.9	16.2	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

When you eat dairy products. You select:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Only skim or 0.5% fat	74	23.5	24.1	24.1
	Low fat products (1-2% fat)	186	59.0	60.6	84.7
	Regular ice cream and yogurt but use low fat milk	35	11.1	11.4	96.1
	Whole fat	12	3.8	3.9	100.0
	Total	307	97.5	100.0	
Missing	System	8	2.5		
Total		315	100.0		

How do you prefer your potatoes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Boiled or baked with no added fat	134	42.5	43.1	43.1
	Boiled or baked with margarine/yogurt	56	17.8	18.0	61.1
	Boiled or baked with margarine/butter and sour cream	72	22.9	23.2	84.2
	French fries, hash browns	49	15.6	15.8	100.0
	Total	311	98.7	100.0	
Missing	System	4	1.3		
Total		315	100.0		

How frequently do you add salt to your food after it is served at the table?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	140	44.4	44.4	44.4
	1-2 times per week	90	28.6	28.6	73.0
	About once a week	41	13.0	13.0	86.0
	With almost all meals	44	14.0	14.0	100.0
	Total	315	100.0	100.0	

How many times do you eat at a "fast food" restaurant?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely and always select from the salad bar	137	43.5	43.5	43.5
	Once a week	112	35.6	35.6	79.0
	2-3 times a week	49	15.6	15.6	94.6
	4 or more times a week	17	5.4	5.4	100.0
	Total	315	100.0	100.0	

How often do you eat any of the following foods (hot dogs, luncheon meat, bacon, ham, sausage, loutza, roast beef)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely or never	180	57.1	57.1	57.1
	1-2 times per week	121	38.4	38.4	95.6
	3-4 times per week	6	1.9	1.9	97.5
	Daily	8	2.5	2.5	100.0
	Total	315	100.0	100.0	

In what form do you most frequently purchase food or meal preparations?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fresh	224	71.1	71.6	71.6
	Canned or frozen without salt	42	13.3	13.4	85.0
	Canned without sauces	13	4.1	4.2	89.1
	Canned, frozen or dry with sauces and/or seasonings	34	10.8	10.9	100.0
	Total	313	99.4	100.0	
Missing	System	2	.6		
Total		315	100.0		

While preparing meals or when eating out, how frequently do you add any or all of the following items to your food (mustard, pickles, relish, soy sauce, ketchup, meat tenderizer, MSG?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely or never	132	41.9	42.7	42.7
	1-2 times per week	96	30.5	31.1	73.8
	3-4 times per week	66	21.0	21.4	95.1
	Daily	15	4.8	4.9	100.0
	Total	309	98.1	100.0	
Missing	System	6	1.9		
Total		315	100.0		

Do you currently have a job or do any unpaid work outside your home? - YES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	217	68.9	100.0	100.0
Missing	System	98	31.1		
Total		315	100.0		

Do you currently have a job or do any unpaid work outside your home? - NO

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	45	14.3	100.0	100.0
Missing	System	270	85.7		
Total		315	100.0		

Last 7 days ... vigorous physical activity ... as part of your work - DAYS PER WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	22	7.0	10.7	10.7
	1	163	51.7	79.5	90.2
	2	8	2.5	3.9	94.1
	4	4	1.3	2.0	96.1
	5	2	.6	1.0	97.1
	7	6	1.9	2.9	100.0
	Total	205	65.1	100.0	
Missing	System	110	34.9		
Total		315	100.0		

Last 7 days ... vigorous physical activity ... as part of your work - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	35	11.1	100.0	100.0
Missing	System	280	88.9		
Total		315	100.0		

How much time do you usually spend on one of those days doing vigorous physical activities as part of your work? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	14	4.4	8.0	8.0
	1	4	1.3	2.3	10.3
	2	6	1.9	3.4	13.8
	3	146	46.3	83.9	97.7
	4	2	.6	1.1	98.9
	8	2	.6	1.1	100.0
	Total	174	55.2	100.0	
Missing	System	141	44.8		
Total		315	100.0		

How much time do you usually spend on one of those days doing vigorous physical activities as part of your work? - MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	2.5	30.8	30.8
	1	2	.6	7.7	38.5
	10	4	1.3	15.4	53.8
	30	12	3.8	46.2	100.0
	Total	26	8.3	100.0	
Missing	System	289	91.7		
Total		315	100.0		

Last 7 days ... moderate physical activity ... as part of your work - DAYS PER WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	12	3.8	5.9	5.9
	1	16	5.1	7.8	13.7
	2	7	2.2	3.4	17.1
	3	148	47.0	72.2	89.3
	4	6	1.9	2.9	92.2
	5	8	2.5	3.9	96.1
	7	8	2.5	3.9	100.0
	Total	205	65.1	100.0	
Missing	System	110	34.9		
Total		315	100.0		

Last 7 days ... moderate physical activity ... as part of your work - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	28	8.9	100.0	100.0
Missing	System	287	91.1		
Total		315	100.0		

How much time do you usually spend on one of those days doing moderate physical activities as part of your work? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	1.9	3.3	3.3
	1	10	3.2	5.6	8.9
	2	12	3.8	6.7	15.6
	4	146	46.3	81.1	96.7
	5	2	.6	1.1	97.8
	6	2	.6	1.1	98.9
	63	2	.6	1.1	100.0
	Total	180	57.1	100.0	
Missing	System	135	42.9		
Total		315	100.0		

How much time do you usually spend on one of those days doing moderate physical activities as part of your work? - MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	1.3	14.3	14.3
	1	10	3.2	35.7	50.0
	10	2	.6	7.1	57.1
	20	2	.6	7.1	64.3
	30	10	3.2	35.7	100.0
	Total	28	8.9	100.0	
Missing	System	287	91.1		
Total		315	100.0		

Last 7 days ... walk for at least 10 minutes ... as part of your work - DAYS PER WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	2.5	4.2	4.2
	1	12	3.8	6.3	10.4
	2	148	47.0	77.1	87.5
	4	4	1.3	2.1	89.6
	5	10	3.2	5.2	94.8
	6	2	.6	1.0	95.8
	7	8	2.5	4.2	100.0
	Total	192	61.0	100.0	
Missing	System	123	39.0		
Total		315	100.0		

Last 7 days ... walk for at least 10 minutes ... as part of your work - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	35	11.1	100.0	100.0
Missing	System	280	88.9		
Total		315	100.0		

How much time do you usually spend on one of those days walking as part of your work? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	1.9	3.5	3.5
	1	6	1.9	3.5	7.0
	2	2	.6	1.2	8.1
	3	146	46.3	84.9	93.0
	4	2	.6	1.2	94.2
	6	2	.6	1.2	95.3
	7	8	2.5	4.7	100.0
	Total	172	54.6	100.0	
Missing	System	143	45.4		
Total		315	100.0		

How much time do you usually spend on one of those days walking as part of your work? - MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	1.9	18.8	18.8
	1	2	.6	6.3	25.0
	10	20	6.3	62.5	87.5
	15	2	.6	6.3	93.8
	30	2	.6	6.3	100.0
	Total	32	10.2	100.0	
Missing	System	283	89.8		
Total		315	100.0		

During the last 7 days, on how many days did you travel in a motor vehicle? - DAYS/WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	2.5	3.2	3.2
	1	4	1.3	1.6	4.8
	2	148	47.0	59.7	64.5
	3	4	1.3	1.6	66.1
	4	2	.6	.8	66.9
	5	10	3.2	4.0	71.0
	7	72	22.9	29.0	100.0
	Total	248	78.7	100.0	
Missing	System	67	21.3		
Total		315	100.0		

During the last 7 days, on how many days did you travel in a motor vehicle? - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	1.9	50.0	50.0
	3	2	.6	16.7	66.7
	20	4	1.3	33.3	100.0
	Total	12	3.8	100.0	
Missing	System	303	96.2		
Total		315	100.0		

How much time do you usually spend on one of those days traveling in a motor vehicle? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	.6	.9	.9
	1	20	6.3	9.1	10.0
	2	35	11.1	15.9	25.9
	3	154	48.9	70.0	95.9
	4	2	.6	.9	96.8
	5	2	.6	.9	97.7
	6	1	.3	.5	98.2
	7	2	.6	.9	99.1
	24	2	.6	.9	100.0
	Total	220	69.8	100.0	
Missing	System	95	30.2		
Total		315	100.0		

How much time do you usually spend on one of those days traveling in a motor vehicle? - MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	.6	8.3	8.3
	1	8	2.5	33.3	41.7
	10	2	.6	8.3	50.0
	15	2	.6	8.3	58.3
	30	4	1.3	16.7	75.0
	40	2	.6	8.3	83.3
	45	2	.6	8.3	91.7
	60	2	.6	8.3	100.0
	Total	24	7.6	100.0	
Missing	System	291	92.4		
Total		315	100.0		

During the last 7 days, on how many days did you bicycle for at least 10 minutes? - DAYS/WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	34	10.8	66.7	66.7
	1	6	1.9	11.8	78.4
	2	3	1.0	5.9	84.3
	3	6	1.9	11.8	96.1
	4	2	.6	3.9	100.0
	Total	51	16.2	100.0	
Missing	System	264	83.8		
Total		315	100.0		

During the last 7 days, on how many days did you bicycle for at least 10 minutes? - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	197	62.5	100.0	100.0
Missing	System	118	37.5		
Total		315	100.0		

How much time do you usually spend on one of those days bicycle from place to place? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	165	52.4	97.6	97.6
	2	2	.6	1.2	98.8
	3	2	.6	1.2	100.0
	Total	169	53.7	100.0	
Missing	System	146	46.3		
Total		315	100.0		

How much time do you usually spend on one of those days bicycle from place to place? - MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	148	47.0	96.1	96.1
	1	4	1.3	2.6	98.7
	10	2	.6	1.3	100.0
	Total	154	48.9	100.0	
Missing	System	161	51.1		
Total		315	100.0		

During the last 7 days, on how many days did you walk for at least 10 minutes? - DAYS/WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	14	4.4	6.1	6.1
	1	18	5.7	7.9	14.0
	2	160	50.8	70.2	84.2
	3	14	4.4	6.1	90.4
	4	2	.6	.9	91.2
	5	6	1.9	2.6	93.9
	7	14	4.4	6.1	100.0
	Total	228	72.4	100.0	
Missing	System	87	27.6		
Total		315	100.0		

During the last 7 days, on how many days did you walk for at least 10 minutes? - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	18	5.7	90.0	90.0
	10	2	.6	10.0	100.0
	Total	20	6.3	100.0	
Missing	System	295	93.7		
Total		315	100.0		

How much time did you usually spend on one of those days walking from place to place? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	2.5	4.7	4.7
	1	10	3.2	5.9	10.6
	2	4	1.3	2.4	12.9
	3	144	45.7	84.7	97.6
	10	4	1.3	2.4	100.0
	Total	170	54.0	100.0	
Missing	System	145	46.0		
Total		315	100.0		

How much time did you usually spend on one of those days walking from place to place? - MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	2.5	13.3	13.3
	1	12	3.8	20.0	33.3
	5	2	.6	3.3	36.7
	10	11	3.5	18.3	55.0
	15	2	.6	3.3	58.3
	20	2	.6	3.3	61.7
	30	21	6.7	35.0	96.7
	45	2	.6	3.3	100.0
	Total	60	19.0	100.0	
Missing	System	255	81.0		
Total		315	100.0		

During the last 7 days, on how many days did you do vigorous physical activities in the garden or yard? - DAYS/WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	26	8.3	14.0	14.0
	1	6	1.9	3.2	17.2
	2	2	.6	1.1	18.3
	2	150	47.6	80.6	98.9
	3	2	.6	1.1	100.0
	Total	186	59.0	100.0	
Missing	System	129	41.0		
Total		315	100.0		

During the last 7 days, on how many days did you do vigorous physical activities in the garden or yard? - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	48	15.2	88.9	88.9
	10	4	1.3	7.4	96.3
	15	2	.6	3.7	100.0
	Total	54	17.1	100.0	
Missing	System	261	82.9		
Total		315	100.0		

How much time do you usually spend on one of those days doing vigorous activities in the garden or yard? HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	10	3.2	5.7	5.7
	1	154	48.9	88.5	94.3
	2	6	1.9	3.4	97.7
	3	4	1.3	2.3	100.0
	Total	174	55.2	100.0	
Missing	System	141	44.8		
Total		315	100.0		

How much time do you usually spend on one of those days doing vigorous activities in the garden or yard? MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	1.3	22.2	22.2
	1	10	3.2	55.6	77.8
	2	2	.6	11.1	88.9
	10	2	.6	11.1	100.0
	Total	18	5.7	100.0	
Missing	System	297	94.3		
Total		315	100.0		

During the last 7 days, on how many days did you do moderate physical activities in the garden or yard? - DAYS/WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	18	5.7	8.6	8.6
	1	14	4.4	6.7	15.2
	2	156	49.5	74.3	89.5
	3	2	.6	1.0	90.5
	4	2	.6	1.0	91.4
	5	6	1.9	2.9	94.3
	7	12	3.8	5.7	100.0
	Total	210	66.7	100.0	
Missing	System	105	33.3		
Total		315	100.0		

During the last 7 days, on how many days did you do moderate physical activities in the garden or yard? - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	.6	6.3	6.3
	1	28	8.9	87.5	93.8
	4	2	.6	6.3	100.0
	Total	32	10.2	100.0	
Missing	System	283	89.8		
Total		315	100.0		

How much time do you usually spend on one of those days doing moderate activities in the garden or yard? HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	12	3.8	6.3	6.3
	1	20	6.3	10.5	16.8
	2	148	47.0	77.9	94.7
	3	2	.6	1.1	95.8
	4	2	.6	1.1	96.8
	5	2	.6	1.1	97.9
	7	2	.6	1.1	98.9
	10	2	.6	1.1	100.0
	Total	190	60.3	100.0	
Missing	System	125	39.7		
Total		315	100.0		

How much time do you usually spend on one of those days doing moderate activities in the garden or yard? MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	1.9	18.8	18.8
	1	6	1.9	18.8	37.5
	3	2	.6	6.3	43.8
	10	12	3.8	37.5	81.3
	30	4	1.3	12.5	93.8
	90	2	.6	6.3	100.0
	Total	32	10.2	100.0	
Missing	System	283	89.8		
Total		315	100.0		

During the last 7 days, on how many days did you do moderate physical activities inside your home? - DAYS/WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	12	3.8	5.6	5.6
	1	27	8.6	12.6	18.1
	2	160	50.8	74.4	92.6
	3	6	1.9	2.8	95.3
	4	4	1.3	1.9	97.2
	5	4	1.3	1.9	99.1
	7	2	.6	.9	100.0
	Total	215	68.3	100.0	
Missing	System	100	31.7		
Total		315	100.0		

During the last 7 days, on how many days did you do moderate physical activities inside your home? - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	19	6.0	61.3	61.3
	5	2	.6	6.5	67.7
	10	10	3.2	32.3	100.0
	Total	31	9.8	100.0	
Missing	System	284	90.2		
Total		315	100.0		

How much time do you usually spend on one of those days doing moderate physical activity inside your home? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	2.5	4.1	4.1
	1	24	7.6	12.2	16.2
	2	13	4.1	6.6	22.8
	3	148	47.0	75.1	98.0
	4	4	1.3	2.0	100.0
	Total	197	62.5	100.0	
Missing	System	118	37.5		
Total		315	100.0		

How much time do you usually spend on one of those days doing moderate physical activity inside your home? - MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	.6	9.1	9.1
	1	6	1.9	27.3	36.4
	10	4	1.3	18.2	54.5
	30	10	3.2	45.5	100.0
	Total	22	7.0	100.0	
Missing	System	293	93.0		
Total		315	100.0		

On how many days did you walk for at least 10 minutes in your leisure time? - DAYS/WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	18	5.7	8.8	8.8
	1	23	7.3	11.2	20.0
	2	6	1.9	2.9	22.9
	3	148	47.0	72.2	95.1
	4	2	.6	1.0	96.1
	5	6	1.9	2.9	99.0
	7	2	.6	1.0	100.0
	Total	205	65.1	100.0	
Missing	System	110	34.9		
Total		315	100.0		

On how many days did you walk for at least 10 minutes in your leisure time? - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	33	10.5	76.7	76.7
	10	2	.6	4.7	81.4
	30	8	2.5	18.6	100.0
	Total	43	13.7	100.0	
Missing	System	272	86.3		
Total		315	100.0		

How much time did you usually spend on one of those days walking in your leisure time? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	2.5	4.3	4.3
	1	28	8.9	14.9	19.1
	2	2	.6	1.1	20.2
	3	146	46.3	77.7	97.9
	5	2	.6	1.1	98.9
	7	2	.6	1.1	100.0
	Total	188	59.7	100.0	
Missing	System	127	40.3		
Total		315	100.0		

How much time did you usually spend on one of those days walking in your leisure time? - MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	1.3	10.8	10.8
	1	16	5.1	43.2	54.1
	10	3	1.0	8.1	62.2
	15	2	.6	5.4	67.6
	20	2	.6	5.4	73.0
	30	8	2.5	21.6	94.6
	40	2	.6	5.4	100.0
	Total	37	11.7	100.0	
Missing	System	278	88.3		
Total		315	100.0		

During the last 7 days, on how many days did you do vigorous physical activities (aerobics)? - DAYS/WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	14	4.4	7.1	7.1
	1	24	7.6	12.2	19.4
	2	146	46.3	74.5	93.9
	3	2	.6	1.0	94.9
	4	6	1.9	3.1	98.0
	5	4	1.3	2.0	100.0
	Total	196	62.2	100.0	
Missing	System	119	37.8		
Total		315	100.0		

During the last 7 days, on how many days did you do vigorous physical activities (aerobics)? - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	24	7.6	75.0	75.0
	10	2	.6	6.3	81.3
	11	2	.6	6.3	87.5
	30	2	.6	6.3	93.8
	40	2	.6	6.3	100.0
	Total	32	10.2	100.0	
Missing	System	283	89.8		
Total		315	100.0		

How much time do you usually spend on one of those days doing vigorous physical activities (aerobics)? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	14	4.4	8.0	8.0
	1	12	3.8	6.8	14.8
	2	4	1.3	2.3	17.0
	3	144	45.7	81.8	98.9
	7	2	.6	1.1	100.0
	Total	176	55.9	100.0	
Missing	System	139	44.1		
Total		315	100.0		

How much time do you usually spend on one of those days doing vigorous physical activities (aerobics)? - MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	.6	5.9	5.9
	1	26	8.3	76.5	82.4
	20	2	.6	5.9	88.2
	45	2	.6	5.9	94.1
	90	2	.6	5.9	100.0
	Total	34	10.8	100.0	
Missing	System	281	89.2		
Total		315	100.0		

During the last 7 days, on how many days did you do moderate physical activities (bicycling)? - DAYS/WEEK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	16	5.1	8.7	8.7
	1	14	4.4	7.6	16.3
	2	148	47.0	80.4	96.7
	3	4	1.3	2.2	98.9
	5	2	.6	1.1	100.0
	Total	184	58.4	100.0	
Missing	System	131	41.6		
Total		315	100.0		

During the last 7 days, on how many days did you do vigorous physical activities (aerobics)? - NONE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	50	15.9	89.3	89.3
	15	4	1.3	7.1	96.4
	30	2	.6	3.6	100.0
	Total	56	17.8	100.0	
Missing	System	259	82.2		
Total		315	100.0		

How much time did you usually spend on one of those days doing moderate physical activities? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	2.5	18.2	18.2
	1	12	3.8	27.3	45.5
	2	2	.6	4.5	50.0
	3	2	.6	4.5	54.5
	4	6	1.9	13.6	68.2
	5	10	3.2	22.7	90.9
	7	2	.6	4.5	95.5
	10	2	.6	4.5	100.0
	Total	44	14.0	100.0	
Missing	System	271	86.0		
Total		315	100.0		

How much time did you usually spend on one of those days doing moderate physical activities? - MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	.6	6.1	6.1
	1	4	1.3	12.1	18.2
	30	27	8.6	81.8	100.0
	Total	33	10.5	100.0	
Missing	System	282	89.5		
Total		315	100.0		

During the last 7 days, how much time did you spend sitting on a weekend? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	2.5	2.9	2.9
	1	2	.6	.7	3.6
	2	12	3.8	4.4	8.0
	3	25	7.9	9.1	17.1
	4	6	1.9	2.2	19.3
	5	30	9.5	10.9	30.2
	6	24	7.6	8.7	38.9
	7	10	3.2	3.6	42.5
	8	4	1.3	1.5	44.0
	9	92	29.2	33.5	77.5
	10	10	3.2	3.6	81.1
	11	3	1.0	1.1	82.2
	12	9	2.9	3.3	85.5
	15	6	1.9	2.2	87.6
	20	4	1.3	1.5	89.1
	24	27	8.6	9.8	98.9
	30	3	1.0	1.1	100.0
	Total	275	87.3	100.0	
Missing	System	40	12.7		
Total		315	100.0		

During the last 7 days, how much time did you spend sitting on a weekend? - MIN./DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	.6	16.7	16.7
	7	2	.6	16.7	33.3
	30	8	2.5	66.7	100.0
	Total	12	3.8	100.0	
Missing	System	303	96.2		
Total		315	100.0		

During the last 7 days, how much time did you spend sitting on a weekday? - HOURS/DAY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	1.9	2.4	2.4
	1	4	1.3	1.6	4.0
	2	8	2.5	3.2	7.1
	3	29	9.2	11.5	18.6
	4	10	3.2	4.0	22.5
	5	29	9.2	11.5	34.0
	6	26	8.3	10.3	44.3
	7	91	28.9	36.0	80.2
	8	12	3.8	4.7	85.0
	10	5	1.6	2.0	87.0
	12	6	1.9	2.4	89.3
	24	27	8.6	10.7	100.0
	Total	253	80.3	100.0	
Missing	System	62	19.7		
Total		315	100.0		

During the last 7 days, how much time did you spend sitting on a weekday? - MIN./DAY

		Frequency	Percent
Missing	System	315	100.0

Appendix 4 – Results of Checklists

The procedure known as the *Analysis of Variance* or *ANOVA* is used to test hypotheses concerning means when we have several populations. ANOVA is a general technique that can be used to test the hypothesis that the means among two or more groups are equal, under the assumption that the sampled populations are normally distributed.

ANOVA checklist A. The Initial hypothesis is that the means of the questions from week to week are equal (H_0 $\mu_1=\mu_{19}=\mu_{36}$). The alternative hypothesis is that at least a couple of the means is not equal. When the p-value (sig) is <0.001 then the original hypothesis is rejected.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
1.How many times a week do you eat red meat?	Between Groups	337,438	2	168,719	316,106	,000
	Within Groups	252,994	474	,534		
	Total	590,432	476			
2.How many ounces of red meat constitute your normal portion?	Between Groups	165,539	2	82,769	221,914	,000
	Within Groups	176,792	474	,373		
	Total	342,331	476			
3.What kind of red meat do you usually choose?	Between Groups	319,031	2	159,516	366,795	,000
	Within Groups	206,138	474	,435		
	Total	525,170	476			
4.How many times a week do you eat seafood?	Between Groups	325,841	2	162,920	761,609	,000
	Within Groups	101,396	474	,214		
	Total	427,237	476			
5.How many ounces of poultry or seafood do you eat for a serving?	Between Groups	257,136	2	128,568	190,756	,000
	Within Groups	319,472	474	,674		
	Total	576,608	476			
6.Do you remove the skin from poultry?	Between Groups	104,805	2	52,403	206,363	,000
	Within Groups	120,365	474	,254		
	Total	225,170	476			
7.How many times a week do you eat at least one half-cup serving of legumes?	Between Groups	81,941	2	40,971	127,806	,000
	Within Groups	151,950	474	,321		
	Total	233,891	476			
8.What kind of milk do you drink?	Between Groups	330,331	2	165,166	304,200	,000
	Within Groups	257,358	474	,543		
	Total	587,690	476			
9.What kind of cheese do you usually eat?	Between Groups	482,881	2	241,440	480,572	,000
	Within Groups	238,138	474	,502		
	Total	721,019	476			
10.How many servings of low-fat, high-calcium foods do you eat daily?	Between Groups	159,614	2	79,807	413,384	,000
	Within Groups	91,509	474	,193		
	Total	251,124	476			
11.What kind of bread do you eat most often?	Between Groups	237,824	2	118,912	339,801	,000
	Within Groups	165,874	474	,350		
	Total	403,698	476			
12.Which is part of your most typical breakfast?	Between Groups	184,080	2	92,040	430,261	,000
	Within Groups	101,396	474	,214		
	Total	285,476	476			
13.What kind of sauce or topping is usually on the pasta you eat?	Between Groups	359,954	2	179,977	1001,635	,000
	Within Groups	85,170	474	,180		
	Total	445,124	476			
14.Which would you be most likely to order at a Chinese restaurant?	Between Groups	94,050	2	47,025	62,416	,000
	Within Groups	357,119	474	,753		
	Total	451,170	476			
15.Which would you be most likely to choose as toppings for pizza?	Between Groups	202,277	2	101,138	280,462	,000
	Within Groups	170,931	474	,361		
	Total	373,208	476			
16.What is the most typical snack for you?	Between Groups	408,860	2	204,430	386,995	,000
	Within Groups	250,390	474	,528		
	Total	659,249	476			
17.How many half-cup servings of a high vitamin C fruit or vegetable do you eat daily?	Between Groups	,340	2	,170	,785	,457
	Within Groups	102,491	474	,216		
	Total	102,830	476			
18.How many half-cup servings of a high vitamin A fruit or vegetable do you eat daily?	Between Groups	75,287	2	37,644	209,500	,000
	Within Groups	85,170	474	,180		
	Total	160,457	476			
19.What kind of salad dressing do you most often choose?	Between Groups	133,589	2	66,795	290,046	,000
	Within Groups	109,157	474	,230		
	Total	242,746	476			
20.What do you usually spread on bread, rolls, or bagels?	Between Groups	91,975	2	45,987	60,011	,000
	Within Groups	363,233	474	,766		
	Total	455,208	476			
21.What spread do you usually choose for sandwiches?	Between Groups	305,711	2	152,855	426,228	,000
	Within Groups	169,987	474	,359		
	Total	475,698	476			
22.Which frozen dessert do you usually choose?	Between Groups	1027,358	2	513,679	1607,455	,000
	Within Groups	151,472	474	,320		
	Total	1178,830	476			
23.How many cups of caffeinated beverages	Between Groups	190,881	2	95,440	196,378	,000
	Within Groups	230,365	474	,486		
	Total	421,245	476			
24.How many total cups of fluid do you drink in a typical day?	Between Groups	338,231	2	169,115	309,779	,000
	Within Groups	258,767	474	,546		
	Total	596,998	476			
25.What kind of cereal do you eat?	Between Groups	405,539	2	202,769	809,767	,000
	Within Groups	118,692	474	,250		
	Total	524,231	476			
26.How many times a week do you eat fried foods?	Between Groups	99,371	2	49,686	380,626	,000
	Within Groups	61,874	474	,131		
	Total	161,245	476			
27.How many times a week do you eat cancer-fighting cruciferous vegetables?	Between Groups	195,736	2	97,868	358,193	,000
	Within Groups	129,509	474	,273		
	Total	325,245	476			

Checklist A

Frequency of eating red meat per week

	0	1 or 2	3 or 4	5 or 6	more than 6
Week 1	0	32	70	35	22
Week 18	50	83	26	0	0
Week 36	114	42	3	0	0

Portion size of red meat intake

	3 oz	4 oz	5 oz	6 oz or more
Week 1	0	81	43	35
Week 18	62	97	0	0
Week 36	103	56	0	0

Type of red meat chosen

	loin or round cuts only	80% lean	ribs, T-bone	hotdogs, bacon and bologna
Week 1	0	0	103	56
Week 18	62	47	50	0
Week 36	102	47	10	0

Frequency of eating seafood

	2 or more	less than 1	never
Week 1	0	124	35
Week 18	62	97	0
Week 36	103	56	0

Portion size of poultry and seafood

	3 oz	4 oz	5 oz	6 oz or more
Week 1	0	32	22	105
Week 18	62	0	97	0
Week 36	62	81	16	0

Removing skin from poultry

	Yes	don't eat poultry	No
Week 1	21	84	54
Week 18	97	62	0
Week 36	143	16	0

Legumes

	3 or more	1 or 2	less than 1	never eat legumes
Week 1	0	116	22	21
Week 18	47	112	0	0
Week 36	93	66	0	0

Kind of milk

	don't drink milk	skim or 1%	2%	Whole
Week 1	35	0	75	49
Week 18	0	109	50	0
Week 36	0	149	10	0

Kind of cheese

	fat free	low fat	whole milk
Week 1	21	0	138
Week 18	62	97	0
Week 36	103	56	0

Low fat, high calcium foods

	3 or more	1 or 2	None
Week 1	0	88	71
Week 18	97	62	0
Week 36	143	16	0

Kind of bread

	100% whole wheat	whole grain	white wheat, italian or french	croissant or biscuit
Week 1	0	49	67	43
Week 18	62	97	0	0
Week 36	103	56	0	0

Type of breakfast

	high fiber cereal or fruit	roll or toast	don't eat breakfast
Week 1	0	35	124
Week 18	62	97	0
Week 36	103	56	0

Pasta toppings

	veggies in olive oil	tomato or marinara	meat sauce	alfredo or cream
Week 1	0	0	137	22
Week 18	112	47	0	0
Week 36	112	47	0	0

Chinese food

	Chicken with steamed vegetables over white rice	Cold sesame noodles	Twice-fried pork/beef	Sizzling shrimp
Week 1	49	22	67	21
Week 18	112	0	47	0
Week 36	112	41	6	0

Pizza toppings

	veggies	Plain cheese	Extra cheese	Sausage and pepperoni
Week 1	0	22	102	35
Week 18	47	86	26	0
Week 36	70	86	3	0

Typical Snack

	Fruit	yogurt	Crackers	Potato chips	Candy bar
Week 1	0	0	56	81	22
Week 18	50	47	62	0	0
Week 36	73	70	16	0	0

Vitamin C fruit

	2 or more	1
Week 1	56	103
Week 18	47	112
Week 36	47	112

Vitamin A

	2 or more	1	None
Week 1	0	137	22
Week 18	112	47	0
Week 36	112	47	0

Salad Dressing

	fat free or low fat	lemon juice or herb vinegar	olive oil canola based	creamy or cheese based
Week 1	0	0	137	22
Week 18	0	62	97	0
Week 36	40	103	16	0

Spread on rolls and bagels

	nothing	jam jelly or honey	margarine	butter	light butter or light margarine
Week 1	32	35	70	22	0
Week 18	0	109	0	0	50
Week 36	0	149	0	0	10

Sandwich spreads

	Nothing	mustard	mayo or butter	light mayo
Week 1	0	22	137	0
Week 18	0	97	0	62
Week 36	46	97	0	16

Frozen dessert

	don't eat	fat free frozen yogurt	sorbet or sherbet	ice cream
Week 1	0	0	22	137
Week 18	62	97	0	0
Week 36	62	97	0	0

Caffeinated beverages

	None	1 or 2	3 or 4	5 or more
Week 1	0	0	124	35
Week 18	0	112	0	47
Week 36	63	90	0	6

Fluid intake per day

	8 or more	6 or 7	4 or 5	Less than 4
Week 1	0	32	35	92
Week 18	62	50	47	0
Week 36	103	50	6	0

Cereal

	High-fiber cereals	Sugary, low-fiber cereals	Regular (high-fat) granola
Week 1	21	103	35
Week 18	159	0	0
Week 36	159	0	0

Fried foods

	never	2 or less	3 or more
Week 1	0	138	21
Week 18	109	50	0
Week 36	149	10	0

Cruciferous vegetables

	3 or more	1 to 2	rarely	none
Week 1	0	71	67	21
Week 18	50	109	0	0
Week 36	137	22	0	0

Crosstab

			1.How many times a week do you eat red meat?					
			0	1 or 2	3 or 4	5 or 6	more than 6	Total
week	1st week	Count	0	32	70	35	22	159
		% within week	,0%	20,1%	44,0%	22,0%	13,8%	100,0%
		% within 1.How many times a week do you eat red meat?	,0%	20,4%	70,7%	100,0%	100,0%	33,3%
		% of Total	,0%	6,7%	14,7%	7,3%	4,6%	33,3%
	19th week	Count	50	83	26	0	0	159
		% within week	31,4%	52,2%	16,4%	,0%	,0%	100,0%
		% within 1.How many times a week do you eat red meat?	30,5%	52,9%	26,3%	,0%	,0%	33,3%
		% of Total	10,5%	17,4%	5,5%	,0%	,0%	33,3%
	36th week	Count	114	42	3	0	0	159
		% within week	71,7%	26,4%	1,9%	,0%	,0%	100,0%
		% within 1.How many times a week do you eat red meat?	69,5%	26,8%	3,0%	,0%	,0%	33,3%
		% of Total	23,9%	8,8%	,6%	,0%	,0%	33,3%
Total		Count	164	157	99	35	22	477
		% within week	34,4%	32,9%	20,8%	7,3%	4,6%	100,0%
		% within 1.How many times a week do you eat red meat?	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	34,4%	32,9%	20,8%	7,3%	4,6%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	331,617[a]	8	,000
Likelihood Ratio	388,981	8	,000
Linear-by-Linear Association	252,505	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,728	,017	-23,166	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,753	,020	-24,944	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			2.How many ounces of red meat constitute your normal portion?				
			3 ounces	4 ounces	5 ounces	6 or more ounces	Total
week	1st week	Count	0	81	43	35	159
		% within week	,0%	50,9%	27,0%	22,0%	100,0%
		% within 2.How many ounces of red meat constitute your normal portion?	,0%	34,6%	100,0%	100,0%	33,3%
		% of Total	,0%	17,0%	9,0%	7,3%	33,3%
	19th week	Count	62	97	0	0	159
		% within week	39,0%	61,0%	,0%	,0%	100,0%
		% within 2.How many ounces of red meat constitute your normal portion?	37,6%	41,5%	,0%	,0%	33,3%
		% of Total	13,0%	20,3%	,0%	,0%	33,3%
	36th week	Count	103	56	0	0	159
		% within week	64,8%	35,2%	,0%	,0%	100,0%
		% within 2.How many ounces of red meat constitute your normal portion?	62,4%	23,9%	,0%	,0%	33,3%
		% of Total	21,6%	11,7%	,0%	,0%	33,3%
Total		Count	165	234	43	35	477
		% within week	34,6%	49,1%	9,0%	7,3%	100,0%
		% within 2.How many ounces of red meat constitute your normal portion?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	34,6%	49,1%	9,0%	7,3%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	264,731[a]	6	,000
Likelihood Ratio	326,777	6	,000
Linear-by-Linear Association	201,547	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 11,67.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,651	,019	-18,677	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,666	,024	-19,451	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			3.What kind of red meat do you usually choose?				
			Loin or round cuts only	80% lean	Rips, T-bon	Hot dogs, bacon, bologna	Total
week	1st week	Count	0	0	103	56	159
		% within week	,0%	,0%	64,8%	35,2%	100,0%
		% within 3.What kind of red meat do you usually choose?	,0%	,0%	63,2%	100,0%	33,3%
		% of Total	,0%	,0%	21,6%	11,7%	33,3%
	19th week	Count	62	47	50	0	159
		% within week	39,0%	29,6%	31,4%	,0%	100,0%
		% within 3.What kind of red meat do you usually choose?	37,8%	50,0%	30,7%	,0%	33,3%
		% of Total	13,0%	9,9%	10,5%	,0%	33,3%
	36th week	Count	102	47	10	0	159
		% within week	64,2%	29,6%	6,3%	,0%	100,0%
		% within 3.What kind of red meat do you usually choose?	62,2%	50,0%	6,1%	,0%	33,3%
		% of Total	21,4%	9,9%	2,1%	,0%	33,3%
Total		Count	164	94	163	56	477
		% within week	34,4%	19,7%	34,2%	11,7%	100,0%
		% within 3.What kind of red meat do you usually choose?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	34,4%	19,7%	34,2%	11,7%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	335,745[a]	6	,000
Likelihood Ratio	431,713	6	,000
Linear-by-Linear Association	266,115	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 18,67.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,748	,019	-24,541	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,751	,020	-24,806	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			4.How many times a week do you eat seafood?				
			2 or more	1	Less than 1	Never	Total
week	1st week	Count	0	0	124	35	159
		% within week	,0%	,0%	78,0%	22,0%	100,0%
		% within 4.How many times a week do you eat seafood?	,0%	,0%	100,0%	100,0%	33,3%
		% of Total	,0%	,0%	26,0%	7,3%	33,3%
	19th week	Count	62	97	0	0	159
		% within week	39,0%	61,0%	,0%	,0%	100,0%
		% within 4.How many times a week do you eat seafood?	37,6%	63,4%	,0%	,0%	33,3%
		% of Total	13,0%	20,3%	,0%	,0%	33,3%
	36th week	Count	103	56	0	0	159
		% within week	64,8%	35,2%	,0%	,0%	100,0%
		% within 4.How many times a week do you eat seafood?	62,4%	36,6%	,0%	,0%	33,3%
		% of Total	21,6%	11,7%	,0%	,0%	33,3%
Total		Count	165	153	124	35	477
		% within week	34,6%	32,1%	26,0%	7,3%	100,0%
		% within 4.How many times a week do you eat seafood?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	34,6%	32,1%	26,0%	7,3%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	508,762[a]	6	,000
Likelihood Ratio	628,652	6	,000
Linear-by-Linear Association	304,717	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 11,67.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,800	,015	-29,070	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,806	,021	-29,678	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			5.How many ounces of poultry or seafood do you eat for a serving?				
			3 ounces	4 ounces	5 ounces	6 or more ounces	Total
week	1st week	Count	0	32	22	105	159
		% within week	,0%	20,1%	13,8%	66,0%	100,0%
		% within 5.How many ounces of poultry or seafood do you eat for a serving?	,0%	28,3%	16,3%	100,0%	33,3%
		% of Total	,0%	6,7%	4,6%	22,0%	33,3%
	19th week	Count	62	0	97	0	159
		% within week	39,0%	,0%	61,0%	,0%	100,0%
		% within 5.How many ounces of poultry or seafood do you eat for a serving?	50,0%	,0%	71,9%	,0%	33,3%
		% of Total	13,0%	,0%	20,3%	,0%	33,3%
	36th week	Count	62	81	16	0	159
		% within week	39,0%	50,9%	10,1%	,0%	100,0%
		% within 5.How many ounces of poultry or seafood do you eat for a serving?	50,0%	71,7%	11,9%	,0%	33,3%
		% of Total	13,0%	17,0%	3,4%	,0%	33,3%
Total		Count	124	113	135	105	477
		% within week	26,0%	23,7%	28,3%	22,0%	100,0%
		% within 5.How many ounces of poultry or seafood do you eat for a serving?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	26,0%	23,7%	28,3%	22,0%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	450,905[a]	6	,000
Likelihood Ratio	529,292	6	,000
Linear-by-Linear Association	198,981	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 35,00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,647	,025	-18,471	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,650	,027	-18,632	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			6.Do you remove the skin from poultry?			
			Yes	Don't eat poultry	No	Total
week	1st week	Count	21	84	54	159
		% within week	13,2%	52,8%	34,0%	100,0%
		% within 6.Do you remove the skin from poultry?	8,0%	51,9%	100,0%	33,3%
		% of Total	4,4%	17,6%	11,3%	33,3%
	19th week	Count	97	62	0	159
		% within week	61,0%	39,0%	,0%	100,0%
		% within 6.Do you remove the skin from poultry?	37,2%	38,3%	,0%	33,3%
		% of Total	20,3%	13,0%	,0%	33,3%
	36th week	Count	143	16	0	159
		% within week	89,9%	10,1%	,0%	100,0%
		% within 6.Do you remove the skin from poultry?	54,8%	9,9%	,0%	33,3%
		% of Total	30,0%	3,4%	,0%	33,3%
Total		Count	261	162	54	477
		% within week	54,7%	34,0%	11,3%	100,0%
		% within 6.Do you remove the skin from poultry?	100,0%	100,0%	100,0%	100,0%
		% of Total	54,7%	34,0%	11,3%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	239,857[a]	4	,000
Likelihood Ratio	274,617	4	,000
Linear-by-Linear Association	203,995	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 18,00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,655	,024	-18,874	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,661	,028	-19,216	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			7.How many times a week do you eat at least one half-cup serving of legumes?				
			3 or more	1 or 2	Less than 1	Never eat legumes	Total
week	1st week	Count	0	116	22	21	159
		% within week	,0%	73,0%	13,8%	13,2%	100,0%
		% within 7.How many times a week do you eat at least one half-cup serving of legumes?	,0%	39,5%	100,0%	100,0%	33,3%
		% of Total	,0%	24,3%	4,6%	4,4%	33,3%
	19th week	Count	47	112	0	0	159
		% within week	29,6%	70,4%	,0%	,0%	100,0%
		% within 7.How many times a week do you eat at least one half-cup serving of legumes?	33,6%	38,1%	,0%	,0%	33,3%
		% of Total	9,9%	23,5%	,0%	,0%	33,3%
	36th week	Count	93	66	0	0	159
		% within week	58,5%	41,5%	,0%	,0%	100,0%
		% within 7.How many times a week do you eat at least one half-cup serving of legumes?	66,4%	22,4%	,0%	,0%	33,3%
		% of Total	19,5%	13,8%	,0%	,0%	33,3%
Total		Count	140	294	22	21	477
		% within week	29,4%	61,6%	4,6%	4,4%	100,0%
		% within 7.How many times a week do you eat at least one half-cup serving of legumes?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	29,4%	61,6%	4,6%	4,4%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	194,427[a]	6	,000
Likelihood Ratio	240,260	6	,000
Linear-by-Linear Association	156,465	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,573	,022	-15,251	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,594	,026	-16,107	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			8.What kind of milk do you drink?				
			Skim or 1%	Don't drink milk	2%	Whole	Total
week	1st week	Count	0	35	75	49	159
		% within week	,0%	22,0%	47,2%	30,8%	100,0%
		% within 8.What kind of milk do you drink?	,0%	100,0%	55,6%	100,0%	33,3%
		% of Total	,0%	7,3%	15,7%	10,3%	33,3%
	19th week	Count	109	0	50	0	159
		% within week	68,6%	,0%	31,4%	,0%	100,0%
		% within 8.What kind of milk do you drink?	42,2%	,0%	37,0%	,0%	33,3%
		% of Total	22,9%	,0%	10,5%	,0%	33,3%
	36th week	Count	149	0	10	0	159
		% within week	93,7%	,0%	6,3%	,0%	100,0%
		% within 8.What kind of milk do you drink?	57,8%	,0%	7,4%	,0%	33,3%
		% of Total	31,2%	,0%	2,1%	,0%	33,3%
Total		Count	258	35	135	49	477
		% within week	54,1%	7,3%	28,3%	10,3%	100,0%
		% within 8.What kind of milk do you drink?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	54,1%	7,3%	28,3%	10,3%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	354,080[a]	6	,000
Likelihood Ratio	457,092	6	,000
Linear-by-Linear Association	245,575	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 11,67.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,718	,020	-22,500	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,743	,020	-24,190	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			9.What kind of cheese do you usually eat?			
			Fat-free	Low fat (5grams or less per ounce)	Whole milk cheese	Total
week	1st week	Count	21	0	138	159
		% within week	13,2%	,0%	86,8%	100,0%
		% within 9.What kind of cheese do you usually eat?	11,3%	,0%	100,0%	33,3%
		% of Total	4,4%	,0%	28,9%	33,3%
	19th week	Count	62	97	0	159
		% within week	39,0%	61,0%	,0%	100,0%
		% within 9.What kind of cheese do you usually eat?	33,3%	63,4%	,0%	33,3%
		% of Total	13,0%	20,3%	,0%	33,3%
	36th week	Count	103	56	0	159
		% within week	64,8%	35,2%	,0%	100,0%
		% within 9.What kind of cheese do you usually eat?	55,4%	36,6%	,0%	33,3%
		% of Total	21,6%	11,7%	,0%	33,3%
Total		Count	186	153	138	477
		% within week	39,0%	32,1%	28,9%	100,0%
		% within 9.What kind of cheese do you usually eat?	100,0%	100,0%	100,0%	100,0%
		% of Total	39,0%	32,1%	28,9%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	423,206[a]	4	,000
Likelihood Ratio	497,506	4	,000
Linear-by-Linear Association	262,108	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 46,00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,742	,025	-24,126	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,674	,034	-19,888	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			10.How many servings of low-fat, high-calcium foods do you eat daily?			
			3 or more	1 or 2	0	Total
week	1st week	Count	0	88	71	159
		% within week	,0%	55,3%	44,7%	100,0%
		% within 10.How many servings of low-fat, high-calcium foods do you eat daily?	,0%	53,0%	100,0%	33,3%
		% of Total	,0%	18,4%	14,9%	33,3%
	19th week	Count	97	62	0	159
		% within week	61,0%	39,0%	,0%	100,0%
		% within 10.How many servings of low-fat, high-calcium foods do you eat daily?	40,4%	37,3%	,0%	33,3%
		% of Total	20,3%	13,0%	,0%	33,3%
	36th week	Count	143	16	0	159
		% within week	89,9%	10,1%	,0%	100,0%
		% within 10.How many servings of low-fat, high-calcium foods do you eat daily?	59,6%	9,6%	,0%	33,3%
		% of Total	30,0%	3,4%	,0%	33,3%
Total		Count	240	166	71	477
		% within week	50,3%	34,8%	14,9%	100,0%
		% within 10.How many servings of low-fat, high-calcium foods do you eat daily?	100,0%	100,0%	100,0%	100,0%
		% of Total	50,3%	34,8%	14,9%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	323,273[a]	4	,000
Likelihood Ratio	415,556	4	,000
Linear-by-Linear Association	269,943	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 23,67.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,753	,016	-24,945	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,768	,019	-26,106	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			11.What kind of bread do you eat most often?				
			100% whole wheat	Whole grain	White, wheat, Italian or French	Croissant or biscuit	Total
week	1st week	Count	0	49	67	43	159
		% within week	,0%	30,8%	42,1%	27,0%	100,0%
		% within 11.What kind of bread do you eat most often?	,0%	24,3%	100,0%	100,0%	33,3%
		% of Total	,0%	10,3%	14,0%	9,0%	33,3%
	19th week	Count	62	97	0	0	159
		% within week	39,0%	61,0%	,0%	,0%	100,0%
		% within 11.What kind of bread do you eat most often?	37,6%	48,0%	,0%	,0%	33,3%
		% of Total	13,0%	20,3%	,0%	,0%	33,3%
	36th week	Count	103	56	0	0	159
		% within week	64,8%	35,2%	,0%	,0%	100,0%
		% within 11.What kind of bread do you eat most often?	62,4%	27,7%	,0%	,0%	33,3%
		% of Total	21,6%	11,7%	,0%	,0%	33,3%
Total		Count	165	202	67	43	477
		% within week	34,6%	42,3%	14,0%	9,0%	100,0%
		% within 11.What kind of bread do you eat most often?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	34,6%	42,3%	14,0%	9,0%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	337,752[a]	6	,000
Likelihood Ratio	404,825	6	,000
Linear-by-Linear Association	239,797	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 14,33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,710	,018	-21,960	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,717	,023	-22,426	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			12.Which is part of your most typical breakfast?			
			High-fiber cereal and fruit	Roll or toast	Don't eat breakfast	Total
week	1st week	Count	0	35	124	159
		% within week	,0%	22,0%	78,0%	100,0%
		% within 12.Which is part of your most typical breakfast?	,0%	18,6%	100,0%	33,3%
		% of Total	,0%	7,3%	26,0%	33,3%
	19th week	Count	62	97	0	159
		% within week	39,0%	61,0%	,0%	100,0%
		% within 12.Which is part of your most typical breakfast?	37,6%	51,6%	,0%	33,3%
		% of Total	13,0%	20,3%	,0%	33,3%
	36th week	Count	103	56	0	159
		% within week	64,8%	35,2%	,0%	100,0%
		% within 12.Which is part of your most typical breakfast?	62,4%	29,8%	,0%	33,3%
		% of Total	21,6%	11,7%	,0%	33,3%
Total		Count	165	188	124	477
		% within week	34,6%	39,4%	26,0%	100,0%
		% within 12.Which is part of your most typical breakfast?	100,0%	100,0%	100,0%	100,0%
		% of Total	34,6%	39,4%	26,0%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	377,516[a]	4	,000
Likelihood Ratio	447,938	4	,000
Linear-by-Linear Association	266,836	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 41,33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,749	,020	-24,616	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,746	,023	-24,410	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			13.What kind of sauce or topping is usually on the pasta you eat?				
			Vegetables tossed lightly with olive oil	Tomato or marinara sauce	Meat sauce	Alfredo or cream sauce	Total
week	1st week	Count	0	0	137	22	159
		% within week	,0%	,0%	86,2%	13,8%	100,0%
		% within 13.What kind of sauce or topping is usually on the pasta you eat?	,0%	,0%	100,0%	100,0%	33,3%
		% of Total	,0%	,0%	28,7%	4,6%	33,3%
	19th week	Count	112	47	0	0	159
		% within week	70,4%	29,6%	,0%	,0%	100,0%
		% within 13.What kind of sauce or topping is usually on the pasta you eat?	50,0%	50,0%	,0%	,0%	33,3%
		% of Total	23,5%	9,9%	,0%	,0%	33,3%
	36th week	Count	112	47	0	0	159
		% within week	70,4%	29,6%	,0%	,0%	100,0%
		% within 13.What kind of sauce or topping is usually on the pasta you eat?	50,0%	50,0%	,0%	,0%	33,3%
		% of Total	23,5%	9,9%	,0%	,0%	33,3%
Total		Count	224	94	137	22	477
		% within week	47,0%	19,7%	28,7%	4,6%	100,0%
		% within 13.What kind of sauce or topping is usually on the pasta you eat?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	47,0%	19,7%	28,7%	4,6%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	477,000[a]	6	,000
Likelihood Ratio	607,235	6	,000
Linear-by-Linear Association	283,142	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,771	,016	-26,408	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,760	,026	-25,509	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			14.Which would you be most likely to order at a Chinese restaurant?				
			Chicken with steamed vegetables over white rice	Cold sesame noodles	Twice-fried pork /beef	Sizzly shrimps	Total
week	1st week	Count	49	22	67	21	159
		% within week	30,8%	13,8%	42,1%	13,2%	100,0%
		% within 14.Which would you be most likely to order at a Chinese restaurant?	17,9%	34,9%	55,8%	100,0%	33,3%
		% of Total	10,3%	4,6%	14,0%	4,4%	33,3%
	19th week	Count	112	0	47	0	159
		% within week	70,4%	,0%	29,6%	,0%	100,0%
		% within 14.Which would you be most likely to order at a Chinese restaurant?	41,0%	,0%	39,2%	,0%	33,3%
		% of Total	23,5%	,0%	9,9%	,0%	33,3%
	36th week	Count	112	41	6	0	159
		% within week	70,4%	25,8%	3,8%	,0%	100,0%
		% within 14.Which would you be most likely to order at a Chinese restaurant?	41,0%	65,1%	5,0%	,0%	33,3%
		% of Total	23,5%	8,6%	1,3%	,0%	33,3%
Total		Count	273	63	120	21	477
		% within week	57,2%	13,2%	25,2%	4,4%	100,0%
		% within 14.Which would you be most likely to order at a Chinese restaurant?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	57,2%	13,2%	25,2%	4,4%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	159,522[a]	6	,000
Likelihood Ratio	196,920	6	,000
Linear-by-Linear Association	90,519	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,436	,034	-10,561	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,409	,038	-9,780	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			15.Which would you be most likely to choose as toppings for pizza?				
			Vegetables (e. g., broccoli, peppers)	Plain cheese	Extra cheese	Sausage and pepperoni	Total
week	1st week	Count	0	22	102	35	159
		% within week	,0%	13,8%	64,2%	22,0%	100,0%
		% within 15.Which would you be most likely to choose as toppings for pizza?	,0%	11,3%	77,9%	100,0%	33,3%
		% of Total	,0%	4,6%	21,4%	7,3%	33,3%
	19th week	Count	47	86	26	0	159
		% within week	29,6%	54,1%	16,4%	,0%	100,0%
		% within 15.Which would you be most likely to choose as toppings for pizza?	40,2%	44,3%	19,8%	,0%	33,3%
		% of Total	9,9%	18,0%	5,5%	,0%	33,3%
	36th week	Count	70	86	3	0	159
		% within week	44,0%	54,1%	1,9%	,0%	100,0%
		% within 15.Which would you be most likely to choose as toppings for pizza?	59,8%	44,3%	2,3%	,0%	33,3%
		% of Total	14,7%	18,0%	,6%	,0%	33,3%
Total		Count	117	194	131	35	477
		% within week	24,5%	40,7%	27,5%	7,3%	100,0%
		% within 15.Which would you be most likely to choose as toppings for pizza?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	24,5%	40,7%	27,5%	7,3%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	300,455[a]	6	,000
Likelihood Ratio	357,008	6	,000
Linear-by-Linear Association	226,362	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 11,67.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,690	,020	-20,754	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,700	,023	-21,379	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			16.What is the most typical snack for you?					
			Fresh fruit	Lowfat yogurt	Crackers or Rusks	Potato chips	Candy bar	Total
week	1st week	Count	0	0	56	81	22	159
		% within week	,0%	,0%	35,2%	50,9%	13,8%	100,0%
		% within 16.What is the most typical snack for you?	,0%	,0%	41,8%	100,0%	100,0%	33,3%
		% of Total	,0%	,0%	11,7%	17,0%	4,6%	33,3%
	19th week	Count	50	47	62	0	0	159
		% within week	31,4%	29,6%	39,0%	,0%	,0%	100,0%
		% within 16.What is the most typical snack for you?	40,7%	40,2%	46,3%	,0%	,0%	33,3%
		% of Total	10,5%	9,9%	13,0%	,0%	,0%	33,3%
	36th week	Count	73	70	16	0	0	159
		% within week	45,9%	44,0%	10,1%	,0%	,0%	100,0%
		% within 16.What is the most typical snack for you?	59,3%	59,8%	11,9%	,0%	,0%	33,3%
		% of Total	15,3%	14,7%	3,4%	,0%	,0%	33,3%
Total		Count	123	117	134	81	22	477
		% within week	25,8%	24,5%	28,1%	17,0%	4,6%	100,0%
		% within 16.What is the most typical snack for you?	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	25,8%	24,5%	28,1%	17,0%	4,6%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	367,233[a]	8	,000
Likelihood Ratio	462,948	8	,000
Linear-by-Linear Association	260,965	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,740	,018	-24,010	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,748	,021	-24,563	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			18.How many half-cup servings of a high vitamin A fruit or vegetable do you eat daily?			
			2 or more	1	None	Total
week	1st week	Count	0	137	22	159
		% within week	,0%	86,2%	13,8%	100,0%
		% within 18.How many half-cup servings of a high vitamin A fruit or vegetable do you eat daily?	,0%	59,3%	100,0%	33,3%
		% of Total	,0%	28,7%	4,6%	33,3%
	19th week	Count	112	47	0	159
		% within week	70,4%	29,6%	,0%	100,0%
		% within 18.How many half-cup servings of a high vitamin A fruit or vegetable do you eat daily?	50,0%	20,3%	,0%	33,3%
		% of Total	23,5%	9,9%	,0%	33,3%
	36th week	Count	112	47	0	159
		% within week	70,4%	29,6%	,0%	100,0%
		% within 18.How many half-cup servings of a high vitamin A fruit or vegetable do you eat daily?	50,0%	20,3%	,0%	33,3%
		% of Total	23,5%	9,9%	,0%	33,3%
Total		Count	224	231	22	477
		% within week	47,0%	48,4%	4,6%	100,0%
		% within 18.How many half-cup servings of a high vitamin A fruit or vegetable do you eat daily?	100,0%	100,0%	100,0%	100,0%
		% of Total	47,0%	48,4%	4,6%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	226,130[a]	4	,000
Likelihood Ratio	295,052	4	,000
Linear-by-Linear Association	164,286	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,587	,027	-15,822	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,596	,032	-16,162	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			19.What kind of salad dressing do you most often choose?				
			Fat-free or low fat	Lemo juice or herb vinegar	Olive or canola oil based	Creamy or cheese based	Total
week	1st week	Count	0	0	137	22	159
		% within week	,0%	,0%	86,2%	13,8%	100,0%
		% within 19.What kind of salad dressing do you most often choose?	,0%	,0%	54,8%	100,0%	33,3%
		% of Total	,0%	,0%	28,7%	4,6%	33,3%
	19th week	Count	0	62	97	0	159
		% within week	,0%	39,0%	61,0%	,0%	100,0%
		% within 19.What kind of salad dressing do you most often choose?	,0%	37,6%	38,8%	,0%	33,3%
		% of Total	,0%	13,0%	20,3%	,0%	33,3%
	36th week	Count	40	103	16	0	159
		% within week	25,2%	64,8%	10,1%	,0%	100,0%
		% within 19.What kind of salad dressing do you most often choose?	100,0%	62,4%	6,4%	,0%	33,3%
		% of Total	8,4%	21,6%	3,4%	,0%	33,3%
Total		Count	40	165	250	22	477
		% within week	8,4%	34,6%	52,4%	4,6%	100,0%
		% within 19.What kind of salad dressing do you most often choose?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	8,4%	34,6%	52,4%	4,6%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	312,990[a]	6	,000
Likelihood Ratio	393,194	6	,000
Linear-by-Linear Association	259,961	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,739	,016	-23,908	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,760	,018	-25,474	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			20.What do you usually spread on bread, rolls, or bagels?					
			Nothing	Jam, jelly, or honey	Light butter or light margarine	Margarine	Butter	Total
week	1st week	Count	32	35	0	70	22	159
		% within week	20,1%	22,0%	,0%	44,0%	13,8%	100,0%
		% within 20.What do you usually spread on bread, rolls, or bagels?	100,0%	11,9%	,0%	100,0%	100,0%	33,3%
		% of Total	6,7%	7,3%	,0%	14,7%	4,6%	33,3%
	19th week	Count	0	109	50	0	0	159
		% within week	,0%	68,6%	31,4%	,0%	,0%	100,0%
		% within 20.What do you usually spread on bread, rolls, or bagels?	,0%	37,2%	83,3%	,0%	,0%	33,3%
		% of Total	,0%	22,9%	10,5%	,0%	,0%	33,3%
	36th week	Count	0	149	10	0	0	159
		% within week	,0%	93,7%	6,3%	,0%	,0%	100,0%
		% within 20.What do you usually spread on bread, rolls, or bagels?	,0%	50,9%	16,7%	,0%	,0%	33,3%
		% of Total	,0%	31,2%	2,1%	,0%	,0%	33,3%
Total		Count	32	293	60	70	22	477
		% within week	6,7%	61,4%	12,6%	14,7%	4,6%	100,0%
		% within 20.What do you usually spread on bread, rolls, or bagels?	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	6,7%	61,4%	12,6%	14,7%	4,6%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	386,505[a]	8	,000
Likelihood Ratio	428,192	8	,000
Linear-by-Linear Association	87,557	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,429	,042	-10,347	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,347	,053	-8,071	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			21.What spread do you usually choose for sandwiches?				
			Nothing	Mustard	Light mayonnaise	Mayonnaise, margarine, or butter	Total
week	1st week	Count	0	22	0	137	159
		% within week	,0%	13,8%	,0%	86,2%	100,0%
		% within 21.What spread do you usually choose for sandwiches?	,0%	10,2%	,0%	100,0%	33,3%
		% of Total	,0%	4,6%	,0%	28,7%	33,3%
	19th week	Count	0	97	62	0	159
		% within week	,0%	61,0%	39,0%	,0%	100,0%
		% within 21.What spread do you usually choose for sandwiches?	,0%	44,9%	79,5%	,0%	33,3%
		% of Total	,0%	20,3%	13,0%	,0%	33,3%
	36th week	Count	46	97	16	0	159
		% within week	28,9%	61,0%	10,1%	,0%	100,0%
		% within 21.What spread do you usually choose for sandwiches?	100,0%	44,9%	20,5%	,0%	33,3%
		% of Total	9,6%	20,3%	3,4%	,0%	33,3%
Total		Count	46	216	78	137	477
		% within week	9,6%	45,3%	16,4%	28,7%	100,0%
		% within 21.What spread do you usually choose for sandwiches?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	9,6%	45,3%	16,4%	28,7%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	497,776[a]	6	,000
Likelihood Ratio	557,791	6	,000
Linear-by-Linear Association	288,540	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 15,33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,779	,021	-27,039	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,767	,024	-26,042	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			22.Which frozen dessert do you usually choose?				
			Don't eat frozen desserts	Fat-free frozen yogurt	Sorbet or sherbet	Ice cream	Total
week	1st week	Count	0	0	22	137	159
		% within week	,0%	,0%	13,8%	86,2%	100,0%
		% within 22.Which frozen dessert do you usually choose?	,0%	,0%	100,0%	100,0%	33,3%
		% of Total	,0%	,0%	4,6%	28,7%	33,3%
	19th week	Count	62	97	0	0	159
		% within week	39,0%	61,0%	,0%	,0%	100,0%
		% within 22.Which frozen dessert do you usually choose?	50,0%	50,0%	,0%	,0%	33,3%
		% of Total	13,0%	20,3%	,0%	,0%	33,3%
	36th week	Count	62	97	0	0	159
		% within week	39,0%	61,0%	,0%	,0%	100,0%
		% within 22.Which frozen dessert do you usually choose?	50,0%	50,0%	,0%	,0%	33,3%
		% of Total	13,0%	20,3%	,0%	,0%	33,3%
Total		Count	124	194	22	137	477
		% within week	26,0%	40,7%	4,6%	28,7%	100,0%
		% within 22.Which frozen dessert do you usually choose?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	26,0%	40,7%	4,6%	28,7%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	477,000[a]	6	,000
Likelihood Ratio	607,235	6	,000
Linear-by-Linear Association	305,147	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,801	,013	-29,127	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,749	,027	-24,634	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			23.How many cups of caffeinated beverages				
			None	1 to 2	3 or 4	5 or more	Total
week	1st week	Count	0	0	124	35	159
		% within week	,0%	,0%	78,0%	22,0%	100,0%
		% within 23.How many cups of caffeinated beverages	,0%	,0%	100,0%	39,8%	33,3%
		% of Total	,0%	,0%	26,0%	7,3%	33,3%
	19th week	Count	0	112	0	47	159
		% within week	,0%	70,4%	,0%	29,6%	100,0%
		% within 23.How many cups of caffeinated beverages	,0%	55,4%	,0%	53,4%	33,3%
		% of Total	,0%	23,5%	,0%	9,9%	33,3%
	36th week	Count	63	90	0	6	159
		% within week	39,6%	56,6%	,0%	3,8%	100,0%
		% within 23.How many cups of caffeinated beverages	100,0%	44,6%	,0%	6,8%	33,3%
		% of Total	13,2%	18,9%	,0%	1,3%	33,3%
Total		Count	63	202	124	88	477
		% within week	13,2%	42,3%	26,0%	18,4%	100,0%
		% within 23.How many cups of caffeinated beverages	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	13,2%	42,3%	26,0%	18,4%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	508,890[a]	6	,000
Likelihood Ratio	614,724	6	,000
Linear-by-Linear Association	213,982	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 21,00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,670	,024	-19,696	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,716	,025	-22,322	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			24.How many total cups of fluid do you drink in a typical day?				Total
			8 or more	6 to 7	4 or 5	Less than 4	
week	1st week	Count	0	32	35	92	159
		% within week	,0%	20,1%	22,0%	57,9%	100,0%
		% within 24.How many total cups of fluid do you drink in a typical day?	,0%	24,2%	39,8%	100,0%	33,3%
		% of Total	,0%	6,7%	7,3%	19,3%	33,3%
	19th week	Count	62	50	47	0	159
		% within week	39,0%	31,4%	29,6%	,0%	100,0%
		% within 24.How many total cups of fluid do you drink in a typical day?	37,6%	37,9%	53,4%	,0%	33,3%
		% of Total	13,0%	10,5%	9,9%	,0%	33,3%
	36th week	Count	103	50	6	0	159
		% within week	64,8%	31,4%	3,8%	,0%	100,0%
		% within 24.How many total cups of fluid do you drink in a typical day?	62,4%	37,9%	6,8%	,0%	33,3%
		% of Total	21,6%	10,5%	1,3%	,0%	33,3%
Total		Count	165	132	88	92	477
		% within week	34,6%	27,7%	18,4%	19,3%	100,0%
		% within 24.How many total cups of fluid do you drink in a typical day?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	34,6%	27,7%	18,4%	19,3%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	316,986[a]	6	,000
Likelihood Ratio	389,063	6	,000
Linear-by-Linear Association	248,013	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 29,33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,722	,020	-22,732	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,716	,022	-22,323	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			25.What kind of cereal do you eat?			
			High-fiber cereals such as bran flakes	Sugary, low-fiber cereals, like Frosted Flakes, or fruit-flavored cereals	Regular (high-fat) granola	Total
week	1st week	Count	21	103	35	159
		% within week	13,2%	64,8%	22,0%	100,0%
		% within 25.What kind of cereal do you eat?	6,2%	100,0%	100,0%	33,3%
		% of Total	4,4%	21,6%	7,3%	33,3%
	19th week	Count	159	0	0	159
		% within week	100,0%	,0%	,0%	100,0%
		% within 25.What kind of cereal do you eat?	46,9%	,0%	,0%	33,3%
		% of Total	33,3%	,0%	,0%	33,3%
	36th week	Count	159	0	0	159
		% within week	100,0%	,0%	,0%	100,0%
		% within 25.What kind of cereal do you eat?	46,9%	,0%	,0%	33,3%
		% of Total	33,3%	,0%	,0%	33,3%
Total		Count	339	103	35	477
		% within week	71,1%	21,6%	7,3%	100,0%
		% within 25.What kind of cereal do you eat?	100,0%	100,0%	100,0%	100,0%
		% of Total	71,1%	21,6%	7,3%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	388,354[a]	4	,000
Likelihood Ratio	449,741	4	,000
Linear-by-Linear Association	270,862	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 11,67.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,754	,017	-25,044	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,773	,018	-26,543	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			26.How many times a week do you eat fried foods?			
			Never	2 or less	3 or more	Total
week	1st week	Count	0	138	21	159
		% within week	,0%	86,8%	13,2%	100,0%
		% within 26.How many times a week do you eat fried foods?	,0%	69,7%	100,0%	33,3%
		% of Total	,0%	28,9%	4,4%	33,3%
	19th week	Count	109	50	0	159
		% within week	68,6%	31,4%	,0%	100,0%
		% within 26.How many times a week do you eat fried foods?	42,2%	25,3%	,0%	33,3%
		% of Total	22,9%	10,5%	,0%	33,3%
	36th week	Count	149	10	0	159
		% within week	93,7%	6,3%	,0%	100,0%
		% within 26.How many times a week do you eat fried foods?	57,8%	5,1%	,0%	33,3%
		% of Total	31,2%	2,1%	,0%	33,3%
Total		Count	258	198	21	477
		% within week	54,1%	41,5%	4,4%	100,0%
		% within 26.How many times a week do you eat fried foods?	100,0%	100,0%	100,0%	100,0%
		% of Total	54,1%	41,5%	4,4%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	310,242[a]	4	,000
Likelihood Ratio	399,661	4	,000
Linear-by-Linear Association	265,511	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,747	,017	-24,478	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,771	,020	-26,359	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			27.How many times a week do you eat cancer-fighting cruciferous vegetables?				
			3 or more	1 to 2	Rarely	None	Total
week	1st week	Count	0	71	67	21	159
		% within week	,0%	44,7%	42,1%	13,2%	100,0%
		% within 27.How many times a week do you eat cancer-fighting cruciferous vegetables?	,0%	35,1%	100,0%	100,0%	33,3%
		% of Total	,0%	14,9%	14,0%	4,4%	33,3%
	19th week	Count	50	109	0	0	159
		% within week	31,4%	68,6%	,0%	,0%	100,0%
		% within 27.How many times a week do you eat cancer-fighting cruciferous vegetables?	26,7%	54,0%	,0%	,0%	33,3%
		% of Total	10,5%	22,9%	,0%	,0%	33,3%
	36th week	Count	137	22	0	0	159
		% within week	86,2%	13,8%	,0%	,0%	100,0%
		% within 27.How many times a week do you eat cancer-fighting cruciferous vegetables?	73,3%	10,9%	,0%	,0%	33,3%
		% of Total	28,7%	4,6%	,0%	,0%	33,3%
Total		Count	187	202	67	21	477
		% within week	39,2%	42,3%	14,0%	4,4%	100,0%
		% within 27.How many times a week do you eat cancer-fighting cruciferous vegetables?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	39,2%	42,3%	14,0%	4,4%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	386,719[a]	6	,000
Likelihood Ratio	450,399	6	,000
Linear-by-Linear Association	276,883	1	,000
N of Valid Cases	477		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 7,00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	-,763	,015	-25,700	,000[c]
Ordinal by Ordinal	Spearman Correlation	-,792	,017	-28,265	,000[c]
N of Valid Cases		477			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

ANOVA checklist B

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
How often do you exercise?	Between Groups	114,333	2	57,167	196,791	,000
	Within Groups	136,823	471	,290		
	Total	251,156	473			
How long do you exercise?	Between Groups	70,215	2	35,108	79,474	,000
	Within Groups	208,063	471	,442		
	Total	278,278	473			
How hard do you exercise?	Between Groups	125,557	2	62,778	244,075	,000
	Within Groups	121,146	471	,257		
	Total	246,703	473			
Activity Index Level	Between Groups	276,637	2	138,319	337,599	,000
	Within Groups	192,975	471	,410		
	Total	469,612	473			

Correlations

		Week	How often do you exercise?	How long do you exercise?	How hard do you exercise?	Activity Index Level
Week	Pearson Correlation	1	,591**	,431**	,614**	,666**
	Sig. (2-tailed)		,000	,000	,000	,000
	N	474	474	474	474	474
How often do you exercise?	Pearson Correlation	,591**	1	,256**	,561**	,728**
	Sig. (2-tailed)	,000		,000	,000	,000
	N	474	474	474	474	474
How long do you exercise?	Pearson Correlation	,431**	,256**	1	,366**	,670**
	Sig. (2-tailed)	,000	,000		,000	,000
	N	474	474	474	474	474
How hard do you exercise?	Pearson Correlation	,614**	,561**	,366**	1	,728**
	Sig. (2-tailed)	,000	,000	,000		,000
	N	474	474	474	474	474
Activity Index Level	Pearson Correlation	,666**	,728**	,670**	,728**	1
	Sig. (2-tailed)	,000	,000	,000	,000	
	N	474	474	474	474	474

**. Correlation is significant at the 0.01 level (2-tailed).

Crosstab

			How often do you exercise?				
			Less than 1 time a week	1 time a week	2 times a week	3 times a week	Total
Week	1st week	Count	44	81	33	0	158
		% within Week	27,8%	51,3%	20,9%	,0%	100,0%
		% within How often do you exercise?	100,0%	69,8%	11,5%	,0%	33,3%
		% of Total	9,3%	17,1%	7,0%	,0%	33,3%
	19th week	Count	0	18	130	10	158
		% within Week	,0%	11,4%	82,3%	6,3%	100,0%
		% within How often do you exercise?	,0%	15,5%	45,1%	38,5%	33,3%
		% of Total	,0%	3,8%	27,4%	2,1%	33,3%
	36th week	Count	0	17	125	16	158
		% within Week	,0%	10,8%	79,1%	10,1%	100,0%
		% within How often do you exercise?	,0%	14,7%	43,4%	61,5%	33,3%
		% of Total	,0%	3,6%	26,4%	3,4%	33,3%
Total		Count	44	116	288	26	474
		% within Week	9,3%	24,5%	60,8%	5,5%	100,0%
		% within How often do you exercise?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	9,3%	24,5%	60,8%	5,5%	100,0%

Crosstab

			How long do you exercise?				
			Less than 5 minutes	5 - 14 minutes	15 - 29 minutes	30 - 44 minutes	Total
Week	1st week	Count	6	67	78	7	158
		% within Week	3,8%	42,4%	49,4%	4,4%	100,0%
		% within How long do you exercise?	100,0%	65,7%	37,1%	4,5%	33,3%
		% of Total	1,3%	14,1%	16,5%	1,5%	33,3%
	19th week	Count	0	18	65	75	158
		% within Week	,0%	11,4%	41,1%	47,5%	100,0%
		% within How long do you exercise?	,0%	17,6%	31,0%	48,1%	33,3%
		% of Total	,0%	3,8%	13,7%	15,8%	33,3%
	36th week	Count	0	17	67	74	158
		% within Week	,0%	10,8%	42,4%	46,8%	100,0%
		% within How long do you exercise?	,0%	16,7%	31,9%	47,4%	33,3%
		% of Total	,0%	3,6%	14,1%	15,6%	33,3%
Total		Count	6	102	210	156	474
		% within Week	1,3%	21,5%	44,3%	32,9%	100,0%
		% within How long do you exercise?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	1,3%	21,5%	44,3%	32,9%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	119,882[a]	6	,000
Likelihood Ratio	138,075	6	,000
Linear-by-Linear Association	87,790	1	,000
N of Valid Cases	474		

a. 3 cells (25,0%) have expected count less than 5. The minimum expected count is 2,00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	,431	,036	10,372	,000[c]
Ordinal by Ordinal	Spearman Correlation	,432	,038	10,415	,000[c]
N of Valid Cases		474			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			How long do you exercise?				
			Less than 5 minutes	5 - 14 minutes	15 - 29 minutes	30 - 44 minutes	Total
Week	1st week	Count	6	67	78	7	158
		% within Week	3,8%	42,4%	49,4%	4,4%	100,0%
		% within How long do you exercise?	100,0%	65,7%	37,1%	4,5%	33,3%
		% of Total	1,3%	14,1%	16,5%	1,5%	33,3%
	19th week	Count	0	18	65	75	158
		% within Week	,0%	11,4%	41,1%	47,5%	100,0%
		% within How long do you exercise?	,0%	17,6%	31,0%	48,1%	33,3%
		% of Total	,0%	3,8%	13,7%	15,8%	33,3%
	36th week	Count	0	17	67	74	158
		% within Week	,0%	10,8%	42,4%	46,8%	100,0%
		% within How long do you exercise?	,0%	16,7%	31,9%	47,4%	33,3%
		% of Total	,0%	3,6%	14,1%	15,6%	33,3%
Total		Count	6	102	210	156	474
		% within Week	1,3%	21,5%	44,3%	32,9%	100,0%
		% within How long do you exercise?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	1,3%	21,5%	44,3%	32,9%	100,0%

The table above shows that the week and the time spend on excercising are not independent (p-value ≤0,001)

The table below shows the pearson correlation figure that explains the relation between the week and the duration of exercise per day. The pearson correlation is positive and statistically signifigant and equals to 0,431 (p-value≤0,001).

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	119,882[a]	6	,000
Likelihood Ratio	138,075	6	,000
Linear-by-Linear Association	87,790	1	,000
N of Valid Cases	474		

a. 3 cells (25,0%) have expected count less than 5. The minimum expected count is 2,00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	,431	,036	10,372	,000[c]
Ordinal by Ordinal	Spearman Correlation	,432	,038	10,415	,000[c]
N of Valid Cases		474			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			How long do you exercise?				Total
			Less than 5 minutes	5 - 14 minutes	15 - 29 minutes	30 - 44 minutes	
Week	1st week	Count	6	67	78	7	158
		% within Week	3,8%	42,4%	49,4%	4,4%	100,0%
		% within How long do you exercise?	100,0%	65,7%	37,1%	4,5%	33,3%
		% of Total	1,3%	14,1%	16,5%	1,5%	33,3%
	19th week	Count	0	18	65	75	158
		% within Week	,0%	11,4%	41,1%	47,5%	100,0%
		% within How long do you exercise?	,0%	17,6%	31,0%	48,1%	33,3%
		% of Total	,0%	3,8%	13,7%	15,8%	33,3%
	36th week	Count	0	17	67	74	158
		% within Week	,0%	10,8%	42,4%	46,8%	100,0%
		% within How long do you exercise?	,0%	16,7%	31,9%	47,4%	33,3%
		% of Total	,0%	3,6%	14,1%	15,6%	33,3%
Total		Count	6	102	210	156	474
		% within Week	1,3%	21,5%	44,3%	32,9%	100,0%
		% within How long do you exercise?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	1,3%	21,5%	44,3%	32,9%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	119,882[a]	6	,000
Likelihood Ratio	138,075	6	,000
Linear-by-Linear Association	87,790	1	,000
N of Valid Cases	474		

a. 3 cells (25,0%) have expected count less than 5. The minimum expected count is 2,00.

The table above shows that the week and the time spend on excercising are not independent (p-value ≤0,001)

The table below shows the pearson correlation figure that explains the relation between the week and the duration of exercise per day. The pearson correlation is positive and statistically signifigant and equals to 0,431 (p-value≤0,001).

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	,431	,036	10,372	,000[c]
Ordinal by Ordinal	Spearman Correlation	,432	,038	10,415	,000[c]
N of Valid Cases		474			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			How hard do you exercise?				
			No change in pulse from resting level	Little change in pulse from resting level	Slight increase in pulse and breathing	Moderate increase in pulse and breathing	Total
Week	1st week	Count	13	100	45	0	158
		% within Week	8,2%	63,3%	28,5%	,0%	100,0%
		% within How hard do you exercise?	100,0%	98,0%	17,0%	,0%	33,3%
		% of Total	2,7%	21,1%	9,5%	,0%	33,3%
	19th week	Count	0	1	110	47	158
		% within Week	,0%	,6%	69,6%	29,7%	100,0%
		% within How hard do you exercise?	,0%	1,0%	41,7%	49,5%	33,3%
		% of Total	,0%	,2%	23,2%	9,9%	33,3%
	36th week	Count	0	1	109	48	158
		% within Week	,0%	,6%	69,0%	30,4%	100,0%
		% within How hard do you exercise?	,0%	1,0%	41,3%	50,5%	33,3%
		% of Total	,0%	,2%	23,0%	10,1%	33,3%
Total		Count	13	102	264	95	474
		% within Week	2,7%	21,5%	55,7%	20,0%	100,0%
		% within How hard do you exercise?	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	2,7%	21,5%	55,7%	20,0%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	297,215[a]	6	,000
Likelihood Ratio	342,655	6	,000
Linear-by-Linear Association	178,139	1	,000
N of Valid Cases	474		

a. 3 cells (25,0%) have expected count less than 5. The minimum expected count is 4,33.

The table above shows that the week and the time spend on excercising are not independent (p-value ≤0,001)

The table below shows the pearson correlation figure that explains the relation between the week and the duration of exercise per day. The pearson correlation is positive and statistically signifigant and equals to 0,614 (p-value≤0,001).

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	,614	,023	16,887	,000[c]
Ordinal by Ordinal	Spearman Correlation	,627	,029	17,477	,000[c]
N of Valid Cases		474			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Crosstab

			Activity Index Level				
			Sedent	Low Active	Moderate active	Active	Total
Week	1st week	Count	117	28	13	0	158
		% within Week	74,1%	17,7%	8,2%	,0%	100,0%
		% within Activity Index Level	98,3%	29,8%	6,4%	,0%	33,3%
		% of Total	24,7%	5,9%	2,7%	,0%	33,3%
	19th week	Count	0	35	97	26	158
		% within Week	,0%	22,2%	61,4%	16,5%	100,0%
		% within Activity Index Level	,0%	37,2%	47,8%	44,8%	33,3%
		% of Total	,0%	7,4%	20,5%	5,5%	33,3%
	36th week	Count	2	31	93	32	158
		% within Week	1,3%	19,6%	58,9%	20,3%	100,0%
		% within Activity Index Level	1,7%	33,0%	45,8%	55,2%	33,3%
		% of Total	,4%	6,5%	19,6%	6,8%	33,3%
Total		Count	119	94	203	58	474
		% within Week	25,1%	19,8%	42,8%	12,2%	100,0%
		% within Activity Index Level	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	25,1%	19,8%	42,8%	12,2%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	323,284[a]	6	,000
Likelihood Ratio	375,721	6	,000
Linear-by-Linear Association	209,890	1	,000
N of Valid Cases	474		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 19,33.

The table above shows that the week and the time spend on excercising are not independent (p-value ≤0,001)

The table below shows the pearson correlation figure that explains the relation between the week and the duration of exercise per day. The pearson correlation is positive and statistically signifigant and equals to 0,666 (p-value≤0,001).

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	,666	,026	19,404	,000[c]
Ordinal by Ordinal	Spearman Correlation	,659	,031	19,057	,000[c]
N of Valid Cases		474			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

ANOVA checklist C

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Arguing or having a conflict with someone	Between Groups	187,560	2	93,780	27,553	,000
	Within Groups	1613,308	474	3,404		
	Total	1800,868	476			
Being with others when they are eating while not eating	Between Groups	798,193	2	399,096	172,618	,000
	Within Groups	1095,899	474	2,312		
	Total	1894,092	476			
Being urged to eat by someone else	Between Groups	617,069	2	308,535	76,640	,000
	Within Groups	1908,214	474	4,026		
	Total	2525,283	476			
Feeling inadequate around others	Between Groups	430,503	2	215,252	54,979	,000
	Within Groups	1855,799	474	3,915		
	Total	2286,302	476			
Social Score	Between Groups	7307,338	2	3653,669	137,679	,000
	Within Groups	12578,792	474	26,538		
	Total	19886,130	476			
Feeling bad, such as being anxious or depressed	Between Groups	541,597	2	270,799	106,086	,000
	Within Groups	1209,950	474	2,553		
	Total	1751,547	476			
Feeling good, happy, or relaxed	Between Groups	15,547	2	7,774	2,093	,124
	Within Groups	1760,528	474	3,714		
	Total	1776,075	476			
Feeling bored or having time on my hands	Between Groups	258,067	2	129,034	23,504	,000
	Within Groups	2602,189	474	5,490		
	Total	2860,256	476			
Feeling stressed or excited	Between Groups	849,170	2	424,585	112,739	,000
	Within Groups	1785,132	474	3,766		
	Total	2634,302	476			
Emotional Score	Between Groups	5081,941	2	2540,971	106,079	,000
	Within Groups	11354,000	474	23,954		
	Total	16435,941	476			
Seeing an advertisement for food or eating and wanting to eat	Between Groups	315,790	2	157,895	30,261	,000
	Within Groups	2473,208	474	5,218		
	Total	2788,998	476			
Passing by a bakery, cookie shop, or other enticement to eat	Between Groups	398,579	2	199,289	40,017	,000
	Within Groups	2360,553	474	4,980		
	Total	2759,132	476			
Being involved in a party, celebration, or special occasion	Between Groups	273,614	2	136,807	33,427	,000
	Within Groups	1939,962	474	4,093		
	Total	2213,577	476			
Eating out	Between Groups	1238,558	2	619,279	243,114	,000
	Within Groups	1207,409	474	2,547		
	Total	2445,966	476			
Situational Score	Between Groups	7920,155	2	3960,078	196,225	,000
	Within Groups	9565,937	474	20,181		
	Total	17486,092	476			
Making excuses to myself about why it's OK to eat	Between Groups	1253,824	2	626,912	226,038	,000
	Within Groups	1314,629	474	2,773		
	Total	2568,453	476			
Berating myself for being so fat or unable to control my eating	Between Groups	494,545	2	247,273	153,952	,000
	Within Groups	761,321	474	1,606		
	Total	1255,866	476			
Worrying about others or about difficulties I am having	Between Groups	537,174	2	268,587	207,167	,000
	Within Groups	614,528	474	1,296		
	Total	1151,702	476			
Thinking about how things should or shouldn't be	Between Groups	544,239	2	272,119	80,001	,000
	Within Groups	1612,289	474	3,401		
	Total	2156,528	476			
Thinking Score	Between Groups	10536,130	2	5268,065	259,331	,000
	Within Groups	9628,855	474	20,314		
	Total	20164,985	476			
Experiencing pain or physical discomfort	Between Groups	122,922	2	61,461	47,262	,000
	Within Groups	616,403	474	1,300		
	Total	739,325	476			
Experiencing trembling, headache, or light headedness associated with no eating or too much caffeine	Between Groups	415,249	2	207,625	63,644	,000
	Within Groups	1546,314	474	3,262		
	Total	1961,564	476			
Experiencing fatigue or feeling overtired	Between Groups	577,124	2	288,562	98,471	,000
	Within Groups	1389,019	474	2,930		
	Total	1966,143	476			
Experiencing hunger pangs or urges to eat, even though I've eaten recently	Between Groups	707,338	2	353,669	101,744	,000
	Within Groups	1647,648	474	3,476		
	Total	2354,985	476			
Physiological Score	Between Groups	6691,170	2	3345,585	287,205	,000
	Within Groups	5521,509	474	11,649		
	Total	12212,679	476			
TOTAL SCORE	Between Groups	184424,834	2	92212,417	275,481	,000
	Within Groups	158663,409	474	334,733		
	Total	343088,243	476			

Checklist C

Table 1. Social Factors

Indicator	Week	Mean	SD	Min	Max
Arguing or having conflict with someone	Week 1	6.52	2.25	3	9
	Week 19	6.04	1.77	3	10
	Week 36	5.02	1.42	3	9
Being with others when they are eating while not eating.	Week 1	8.16	1.67	3	10
	Week 19	6.15	1.58	3	10
	Week 36	5.04	1.42	3	9
Being urged to eat by someone else	Week 1	6.99	2.44	1	10
	Week 19	4.89	1.86	1	10
	Week 36	4.35	1.64	1	10
Feeling inadequate around others	Week 1	6.62	2.63	3	10
	Week 19	5.80	1.80	3	10
	Week 36	4.32	1.26	3	10
Score	Week 1	28.29	5.96	18	35
	Week 19	22.88	5.08	16	35
	Week 36	18.73	4.28	13	35

Table 2. Emotional Factors

Indicator	Week	Mean	SD	Min	Max
Feeling bad, such as being anxious or depressed	Week 1	7.42	2.12	4	10
	Week 19	6.10	1.20	4	10
	Week 36	4.81	1.31	3	10
Feeling good, happy or relaxed	Week 1	4.13	2.04	1	7
	Week 19	4.21	1.95	1	7
	Week 36	3.79	1.78	1	7
Feeling bored or having time on my hands	Week 1	5.33	3.13	2	10
	Week 19	4.20	2.06	2	9
	Week 36	3.55	1.55	2	9
Feeling stressed or excited	Week 1	8.16	1.86	4	10
	Week 19	6.67	1.88	3	10
	Week 36	4.90	2.08	3	10
Score	Week 1	25.04	6.07	15	31
	Week 19	21.18	3.95	14	31
	Week 36	17.05	4.41	10	31

Table 3. Situational Factors

Indicator	Week	Mean	SD	Min	Max
Seeing an advertisement for food or eating and wanting to eat	Week 1	6.69	2.83	2	9
	Week 19	5.93	2.15	2	9
	Week 36	4.71	1.74	2	9
Passing by a bakery, cookie shop, or other enticement to eat	Week 1	6.31	2.79	1	9
	Week 19	5.17	2.07	1	9
	Week 36	4.07	1.70	1	9
Being involved in a party, celebration, or special occasion	Week 1	6.23	2.19	1	9
	Week 19	5.50	2.16	1	9
	Week 36	4.39	1.69	1	9
Eating out	Week 1	8.98	1.06	7	10
	Week 19	6.65	1.76	4	10
	Week 36	5.06	1.85	3	10
Score	Week 1	28.21	4.69	20	36
	Week 19	23.25	4.36	17	36
	Week 36	18.23	4.42	13	36

Table 4. Thinking Factors

Indicator	Week	Mean	SD	Min	Max
Making excuses to myself about why it's OK to eat	Week 1	8.98	1.74	4	10
	Week 19	7.36	1.39	4	10
	Week 36	5.03	1.83	3	10
Berating myself for being so far or unable to control my eating	Week 1	8.35	1.43	5	10
	Week 19	6.69	0.86	5	10
	Week 36	5.91	1.42	3	10
Worrying about others or about difficulties I am having	Week 1	8.01	1.13	6	10
	Week 19	7.16	0.80	6	10
	Week 36	5.46	1.40	4	9
Thinking about how things should or shouldn't be	Week 1	8.02	1.67	6	10
	Week 19	7.38	1.68	5	10
	Week 36	5.50	2.14	2	10
Score	Week 1	33.36	3.93	27	39
	Week 19	28.59	2.92	25	39
	Week 36	21.91	6.08	12	39

Table 5. Physiological Factors

Indicator	Week	Mean	SD	Min	Max
Experiencing pain or physical discomfort	Week 1	6.92	1.23	5	10
	Week 19	6.39	1.15	5	10
	Week 36	5.68	1.03	5	10
Experiencing trembling, headache, or light headedness associated with no eating or too much caffeine	Week 1	7.49	2.34	3	9
	Week 19	6.26	1.48	3	9
	Week 36	5.21	1.46	3	9
Experiencing hunger pangs or urges	Week 1	8.18	1.98	5	10
	Week 19	6.93	1.38	5	10
	Week 36	5.48	1.72	3	10
Experiencing hunger pangs or urges to eat, even though I have eaten recently	Week 1	7.55	2.39	4	10
	Week 19	5.72	1.75	3	10
	Week 36	4.59	1.28	3	10
Score	Week 1	30.13	3.31	22	35
	Week 19	25.30	2.53	20	35
	Week 36	20.96	4.19	16	35

In all cases there is enough statistical evidence to say that there is not any difference in the means (p-value > 0.005)

Social Factor

Correlations

		Week	Social Score	Emotional Score	Situational Score	Thinking Score	Physiological Score	TOTAL SCORE
Week	Pearson Correlation	1	-,604**	-,556**	-,673**	-,721**	-,739**	-,733**
	Sig. (2-tailed)		,000	,000	,000	,000	,000	,000
	N	477	477	477	477	477	477	477
Social Score	Pearson Correlation	-,604**	1	,760**	,798**	,513**	,584**	,822**
	Sig. (2-tailed)	,000		,000	,000	,000	,000	,000
	N	477	477	477	477	477	477	477
Emotional Score	Pearson Correlation	-,556**	,760**	1	,855**	,799**	,792**	,938**
	Sig. (2-tailed)	,000	,000		,000	,000	,000	,000
	N	477	477	477	477	477	477	477
Situational Score	Pearson Correlation	-,673**	,798**	,855**	1	,769**	,768**	,936**
	Sig. (2-tailed)	,000	,000	,000		,000	,000	,000
	N	477	477	477	477	477	477	477
Thinking Score	Pearson Correlation	-,721**	,513**	,799**	,769**	1	,925**	,889**
	Sig. (2-tailed)	,000	,000	,000	,000		,000	,000
	N	477	477	477	477	477	477	477
Physiological Score	Pearson Correlation	-,739**	,584**	,792**	,768**	,925**	1	,900**
	Sig. (2-tailed)	,000	,000	,000	,000	,000		,000
	N	477	477	477	477	477	477	477
TOTAL SCORE	Pearson Correlation	-,733**	,822**	,938**	,936**	,889**	,900**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	
	N	477	477	477	477	477	477	477

**. Correlation is significant at the 0.01 level (2-tailed).

Emotional factors

Week * section one by one question

Correlations

		Week	Arguing or having a conflict with someone	Being with others when they are eating while not eating	Being urged to eat by someone else	Feeling inadequate around others	Social Score
Week	Pearson Correlation	1	-,317**	-,639**	-,465**	-,429**	-,604**
	Sig. (2-tailed)		,000	,000	,000	,000	,000
	N	477	477	477	477	477	477
Arguing or having a conflict with someone	Pearson Correlation	-,317**	1	,417**	,134**	,648**	,697**
	Sig. (2-tailed)	,000		,000	,003	,000	,000
	N	477	477	477	477	477	477
Being with others when they are eating while not eating	Pearson Correlation	-,639**	,417**	1	,688**	,597**	,882**
	Sig. (2-tailed)	,000	,000		,000	,000	,000
	N	477	477	477	477	477	477
Being urged to eat by someone else	Pearson Correlation	-,465**	,134**	,688**	1	,239**	,690**
	Sig. (2-tailed)	,000	,003	,000		,000	,000
	N	477	477	477	477	477	477
Feeling inadequate around others	Pearson Correlation	-,429**	,648**	,597**	,239**	1	,803**
	Sig. (2-tailed)	,000	,000	,000	,000		,000
	N	477	477	477	477	477	477
Social Score	Pearson Correlation	-,604**	,697**	,882**	,690**	,803**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	
	N	477	477	477	477	477	477

**. Correlation is significant at the 0.01 level (2-tailed).

Emotional Factors

(Situational Factors)

Correlations

		Week	Seeing an advertisement for food or eating and wanting to eat	Passing by a bakery, cookie shop, or other enticement to eat	Being involved in a party, celebration, or special occasion	Eating out	Situational Score
Week	Pearson Correlation	1	-,334**	-,380**	-,350**	-,706**	-,673**
	Sig. (2-tailed)		,000	,000	,000	,000	,000
	N	477	477	477	477	477	477
Seeing an advertisement for food or eating and wanting to eat	Pearson Correlation	-,334**	1	,119**	,303**	,443**	,720**
	Sig. (2-tailed)	,000		,009	,000	,000	,000
	N	477	477	477	477	477	477
Passing by a bakery, cookie shop, or other enticement to eat	Pearson Correlation	-,380**	,119**	1	-,061	,185**	,492**
	Sig. (2-tailed)	,000	,009		,181	,000	,000
	N	477	477	477	477	477	477
Being involved in a party, celebration, or special occasion	Pearson Correlation	-,350**	,303**	-,061	1	,460**	,624**
	Sig. (2-tailed)	,000	,000	,181		,000	,000
	N	477	477	477	477	477	477
Eating out	Pearson Correlation	-,706**	,443**	,185**	,460**	1	,788**
	Sig. (2-tailed)	,000	,000	,000	,000		,000
	N	477	477	477	477	477	477
Situational Score	Pearson Correlation	-,673**	,720**	,492**	,624**	,788**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	
	N	477	477	477	477	477	477

**. Correlation is significant at the 0.01 level (2-tailed).

Thinking Factors

Correlations

		Week	Making excuses to myself about why it's OK to eat	Berating myself for being so fat or unable to control my eating	Worrying about others or about difficulties I am having	Thinking about how things should or shouldn't be	Thinking Score
Week	Pearson Correlation	1	-,696**	-,612**	-,673**	-,485**	-,721**
	Sig. (2-tailed)		,000	,000	,000	,000	,000
	N	477	477	477	477	477	477
Making excuses to myself about why it's OK to eat	Pearson Correlation	-,696**	1	,734**	,713**	,548**	,890**
	Sig. (2-tailed)	,000		,000	,000	,000	,000
	N	477	477	477	477	477	477
Berating myself for being so fat or unable to control my eating	Pearson Correlation	-,612**	,734**	1	,643**	,402**	,796**
	Sig. (2-tailed)	,000	,000		,000	,000	,000
	N	477	477	477	477	477	477
Worrying about others or about difficulties I am having	Pearson Correlation	-,673**	,713**	,643**	1	,792**	,913**
	Sig. (2-tailed)	,000	,000	,000		,000	,000
	N	477	477	477	477	477	477
Thinking about how things should or shouldn't be	Pearson Correlation	-,485**	,548**	,402**	,792**	1	,812**
	Sig. (2-tailed)	,000	,000	,000	,000		,000
	N	477	477	477	477	477	477
Thinking Score	Pearson Correlation	-,721**	,890**	,796**	,913**	,812**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	
	N	477	477	477	477	477	477

**. Correlation is significant at the 0.01 level (2-tailed).

Physiological Factors

Correlations

		Week	Experiencing pain or physical discomfort	Experiencing trembling, headache, or light headedness associated with no eating or too much caffeine	Experiencing fatigue or feeling overtired	Experiencing hunger pangs or urges to eat, even though I've eaten recently	Physiological Score
Week	Pearson Correlation	1	-,407**	-,459**	-,542**	-,542**	-,739**
	Sig. (2-tailed)		,000	,000	,000	,000	,000
	N	477	477	477	477	477	477
Experiencing pain or physical discomfort	Pearson Correlation	-,407**	1	,447**	,506**	-,076	,595**
	Sig. (2-tailed)	,000		,000	,000	,096	,000
	N	477	477	477	477	477	477
Experiencing trembling, headache, or light headedness associated with no eating or too much caffeine	Pearson Correlation	-,459**	,447**	1	,219**	,453**	,798**
	Sig. (2-tailed)	,000	,000		,000	,000	,000
	N	477	477	477	477	477	477
Experiencing fatigue or feeling overtired	Pearson Correlation	-,542**	,506**	,219**	1	,066	,643**
	Sig. (2-tailed)	,000	,000	,000		,147	,000
	N	477	477	477	477	477	477
Experiencing hunger pangs or urges to eat, even though I've eaten recently	Pearson Correlation	-,542**	-,076	,453**	,066	1	,629**
	Sig. (2-tailed)	,000	,096	,000	,147		,000
	N	477	477	477	477	477	477
Physiological Score	Pearson Correlation	-,739**	,595**	,798**	,643**	,629**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	
	N	477	477	477	477	477	477

**. Correlation is significant at the 0.01 level (2-tailed).

ANOVA CHECKLIST D

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
No time in my busy schedule	Between Groups	,713	2	,357	2,367	,095
	Within Groups	70,949	471	,151		
	Total	71,662	473			
No Energy	Between Groups	38,063	2	19,032	190,953	,000
	Within Groups	46,943	471	,100		
	Total	85,006	473			
I'm too tired	Between Groups	20,089	2	10,044	57,383	,000
	Within Groups	82,443	471	,175		
	Total	102,532	473			
Lack of discipline	Between Groups	3,308	2	1,654	30,355	,000
	Within Groups	25,665	471	,054		
	Total	28,973	473			
Too hard... there's got to be an easier way	Between Groups	3,308	2	1,654	30,355	,000
	Within Groups	25,665	471	,054		
	Total	28,973	473			
Discouraging.	Between Groups	,342	2	,171	7,089	,001
	Within Groups	11,354	471	,024		
	Total	11,696	473			
Not enjoyable	Between Groups	1,523	2	,762	21,460	,000
	Within Groups	16,715	471	,035		
	Total	18,238	473			
Bad experience	Between Groups	,342	2	,171	7,089	,001
	Within Groups	11,354	471	,024		
	Total	11,696	473			
Expense of equipment, clothes, membership	Between Groups	1,523	2	,762	21,460	,000
	Within Groups	16,715	471	,035		
	Total	18,238	473			
Distance	Between Groups	,000	2	,000	.	.
	Within Groups	,000	471	,000		
	Total	,000	473			
Inconvenience	Between Groups	6,418	2	3,209	51,454	,000
	Within Groups	29,373	471	,062		
	Total	35,791	473			
Boredom	Between Groups	6,418	2	3,209	51,454	,000
	Within Groups	29,373	471	,062		
	Total	35,791	473			
Lack of variety	Between Groups	1,688	2	,844	22,754	,000
	Within Groups	17,468	471	,037		
	Total	19,156	473			
Injury/Health Problems	Between Groups	,068	2	,034	,153	,859
	Within Groups	104,247	471	,221		
	Total	104,314	473			
Chronic Physcial Discomfort	Between Groups	,422	2	,211	,842	,431
	Within Groups	117,975	471	,250		
	Total	118,397	473			
Embarassment	Between Groups	5,468	2	2,734	11,841	,000
	Within Groups	108,759	471	,231		
	Total	114,228	473			
Social Discomfort	Between Groups	12,304	2	6,152	34,394	,000
	Within Groups	84,247	471	,179		
	Total	96,551	473			
Lack of understanding of the benefits	Between Groups	4,595	2	2,297	12,955	,000
	Within Groups	83,525	471	,177		
	Total	88,120	473			
Low Priority	Between Groups	6,751	2	3,376	49,149	,000
	Within Groups	32,348	471	,069		
	Total	39,099	473			
Apathy	Between Groups	14,194	2	7,097	91,060	,000
	Within Groups	36,709	471	,078		
	Total	50,903	473			
Don't care to	Between Groups	6,093	2	3,046	49,717	,000
	Within Groups	28,861	471	,061		
	Total	34,954	473			
Weather conditions	Between Groups	6,418	2	3,209	51,454	,000
	Within Groups	29,373	471	,062		
	Total	35,791	473			

Progress Chart Results

ALL MALES AND FEMALES
ALL AGE GROUPS
GOOD AND BAD BEHAVIOUR

1--18

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	192	85,6224	-11,96	16,56515	0,000
	18	192	73,6594		15,06827	
WC	1	192	99,0208	-11,70	13,93176	0,000
	18	192	87,3203		12,45023	
BF	1	192	39,0566	-8,17	7,32518	0,000
	18	192	30,8865		7,37744	
LBM (%)	1	192	60,9434	8,17	7,32518	0,000
	18	192	69,1135		7,37744	
TBW (%)	1	192	40,2956	2,42	22,08735	0,138
	18	192	42,7152		4,47923	
BMR	1	192	1748,3317	-136,70	320,80286	0,000
	18	192	1611,6293		285,89169	
BMI	1	192	30,3081	-4,26	4,48137	0,000
	18	192	26,0437		3,95472	

ALL MALES AND FEMALES
ALL AGE GROUPS
GOOD AND BAD CONTROL

1--18

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	145	86,8421	-5,56	15,41322	0,002
	18	145	81,2793		15,17165	
WC	1	145	100,7517	-5,68	14,68821	0,002
	18	145	95,0690		15,50836	
BF	1	145	40,3222	-0,18	8,57718	0,865
	18	145	40,1441		9,17603	
LBM (%)	1	145	59,6778	0,18	8,57718	0,865
	18	145	59,8559		9,17603	
TBW (%)	1	145	37,3418	1,62	4,63413	0,004
	18	145	38,9602		4,88144	
BMR	1	145	1722,3543	-59,86	256,77662	0,045
	18	145	1662,4952		249,09671	
BMI	1	145	31,7613	-2,05	5,20681	0,001
	18	145	29,7141		5,10319	

20--36

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	192	73,0943	-1,27	14,49406	0,384
	36	192	71,8229		14,07434	
WC	20	192	86,4583	-2,04	12,12806	0,095
	36	192	84,4219		11,70779	
BF	20	192	30,8262	-1,38	7,45628	0,085
	36	192	29,4431		8,20970	
LBM (%)	20	192	69,1738	1,38	7,45628	0,085
	36	192	70,5569		8,20970	
TBW (%)	20	192	42,8951	0,45	4,42680	0,313
	36	192	43,3421		4,23885	
BMR	20	192	1604,7982	-14,05	278,85301	0,619
	36	192	1590,7440		274,50952	
BMI	20	192	25,8511	-0,45	3,78894	0,229
	36	192	25,3976		3,59095	

20--36

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	145	80,8648	-1,69	15,18661	0,349
	36	145	79,1793		15,43680	
WC	20	145	94,7586	-2,39	15,41251	0,202
	36	145	92,3655		16,46200	
BF	20	145	41,1266	-0,11	9,06874	0,915
	36	145	41,0119		9,31902	
LBM (%)	20	145	58,8734	0,11	9,06874	0,915
	36	145	58,9881		9,31902	
TBW (%)	20	145	39,0828	0,59	4,88856	0,312
	36	145	39,6775		5,10975	
BMR	20	145	1657,8116	-18,31	249,47016	0,533
	36	145	1639,5001		250,28730	
BMI	20	145	29,5601	-0,61	5,09715	0,314
	36	145	28,9472		5,25787	

GOOD RESULTS / BEHAVIOUR MODIFICATION

1st and 18th weeks: In all groups there is enough statistical evidence to say that there is a difference in the means where $p<0,05$

20th and 36th weeks: In all groups there is enough statistical evidence to say that there is not any difference in the means where $p>0,05$

1-18

20-36

MALES
18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	20	101,10	-14,97	9,14	0,000
	18	20	86,13		8,33	
WC	1	20	107,95	-14,55	6,21	0,000
	18	20	93,40		5,21	
BF	1	20	37,64	-10,10	7,39	0,000
	18	20	27,54		7,54	
LBM (%)	1	20	62,35	10,11	7,39	0,000
	18	20	72,46		7,54	
TBW(%)	1	20	40,86	4,66	2,24	0,000
	18	20	45,52		2,81	
BMR	1	20	2174,82	-205,09	129,42	0,000
	18	20	1969,73		118,42	
BMI	1	20	32,89	-4,87	2,68	0,000
	18	20	28,02		2,51	

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	20	85,42	-1,04	8,39	0,698
	36	20	84,38		8,43	
WC	20	20	92,45	-2,75	5,09	0,083
	36	20	89,70		4,65	
BF	20	20	26,72	-1,87	7,91	0,489
	36	20	24,85		9,00	
LBM (%)	20	20	73,28	1,87	7,91	0,489
	36	20	75,16		9,00	
TBW (%)	20	20	45,79	0,39	2,80	0,660
	36	20	46,18		2,72	
BMR	20	20	1960,00	-14,25	119,92	0,713
	36	20	1945,76		123,12	
BMI	20	20	27,79	-0,35	2,49	0,652
	36	20	27,44		2,38	

MALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	35	100,822988	-12,37	13,83984	0,000
	18	35	88,4543		13,70709	
WC	1	35	111,8571	-13,14	9,65932	0,000
	18	35	98,7143		9,95747	
BF	1	35	40,8743	-8,18	6,36608	0,000
	18	35	32,6914		7,96955	
LBM (%)	1	35	59,1257	8,18	6,36608	0,000
	18	35	67,3086		7,96955	
TBW(%)	1	35	49,4174	-4,85	50,58814	0,573
	18	35	44,5671		3,55871	
BMR	1	35	2101,9131	-169,59	214,42934	0,001
	18	35	1932,3209		210,89957	
BMI	1	35	32,1983	-3,95	3,77040	0,000
	18	35	28,2443		3,75064	

MALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	35	87,3743	-1,30	11,94203	0,643
	36	35	86,0771		11,33532	
WC	20	35	98,0000	-1,66	9,70446	0,466
	36	35	96,3429		9,21936	
BF	20	35	33,0346	-0,13	8,05982	0,950
	36	35	32,9094		8,47166	
LBM (%)	20	35	66,9654	0,13	8,05982	0,950
	36	35	67,0906		8,47166	
TBW (%)	20	35	44,8403	0,43	3,27289	0,581
	36	35	45,2709		3,21766	
BMR	20	35	1917,5249	-17,77	189,55714	0,690
	36	35	1899,7540		180,91575	
BMI	20	35	27,9037	-0,40	3,16961	0,600
	36	35	27,5074		3,12179	

MALES
41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	20	95,8050	-12,34	12,10883	0,001
	18	20	83,4700		9,63175	
WC	1	20	109,7500	-13,25	7,68371	0,000
	18	20	96,5000		5,68701	
BF	1	20	35,4145	-7,57	7,72650	0,003
	18	20	27,8470		7,58524	
LBM (%)	1	20	64,5855	7,57	7,72650	0,003
	18	20	72,1530		7,58524	
TBW(%)	1	20	40,7255	3,89	2,58728	0,000
	18	20	44,6130		2,96901	
BMR	1	20	1941,7985	-168,99	189,42838	0,004
	18	20	1772,8090		155,92111	
BMI	1	20	31,1315	-3,99	3,30241	0,000
	18	20	27,1445		2,77163	

MALES
41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	20	83,0850	-0,67	9,08308	0,811
	36	20	82,4150		8,54106	
WC	20	20	95,5000	-2,15	5,40468	0,196
	36	20	93,3500		4,91266	
BF	20	20	27,8280	-1,88	8,00043	0,509
	36	20	25,9435		9,79800	
LBM (%)	20	20	72,1720	1,88	8,00043	0,509
	36	20	74,0565		9,79800	
TBW (%)	20	20	44,7250	0,23	2,86489	0,800
	36	20	44,9535		2,81375	
BMR	20	20	1767,5345	-9,18	148,69200	0,842
	36	20	1758,3555		140,44047	
BMI	20	20	27,0235	-0,21	2,63860	0,797
	36	20	26,8110		2,54190	

BAD RESULTS / BEHAVIOUR MODIFICATION

few people had bad results in the 36week program, thus there are very few data in all the groups and there is not any difference in the means where p>0,05

FEMALES 18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	23	79,5087	-13,12	10,85880	0,000
	18	23	66,3913		9,92581	
WC	1	23	95,6522	-13,26	12,09661	0,000
	18	23	82,3913		11,80423	
BF	1	23	41,6130	-9,28	7,70439	0,000
	18	23	32,3330		6,04852	
LBM (%)	1	23	58,3870	9,28	7,70439	0,000
	18	23	67,6670		6,04852	
TBW(%)	1	23	37,4939	4,73	2,83532	0,000
	18	23	42,2191		3,91556	
BMR	1	23	1612,6835	-125,93	109,77641	0,000
	18	23	1486,7565		100,14062	
BMI	1	23	29,8091	-4,91	3,43619	0,000
	18	23	24,9013		3,37444	

FEMALES 18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	23	66,0000	-1,57	9,71058	0,568
	36	23	64,4348		8,71167	
WC	20	23	81,5870	-3,24	11,56469	0,316
	36	23	78,3478		10,01639	
BF	20	23	31,6683	-2,48	5,29376	0,127
	36	23	29,1913		5,50334	
LBM (%)	20	23	68,3317	2,48	5,29376	0,127
	36	23	70,8087		5,50334	
TBW (%)	20	23	42,3661	0,58	3,85305	0,596
	36	23	42,9452		3,48970	
BMR	20	23	1483,0000	-15,03	98,08257	0,588
	36	23	1467,9739		88,61512	
BMI	20	23	24,7530	-0,59	3,28023	0,517
	36	23	24,1630		2,82211	

FEMALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	53	75,7415	-11,76	11,32065	0,000
	18	53	63,9849		9,30840	
WC	1	53	90,6981	-9,91	10,43217	0,000
	18	53	80,7925		10,04386	
BF	1	53	39,3283	-9,06	6,77808	0,000
	18	53	30,2700		7,02798	
LBM (%)	1	53	60,6717	9,06	6,77808	0,000
	18	53	69,7300		7,02798	
TBW(%)	1	53	37,2253	4,22	3,93599	0,000
	18	53	41,4411		4,71212	
BMR	1	53	1512,3298	-112,95	105,81750	0,000
	18	53	1399,3777		86,54910	
BMI	1	53	29,0092	-4,49	4,92022	0,000
	18	53	24,5145		4,09565	

FEMALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	53	63,6000	-1,40	8,91129	0,389
	36	53	62,1981		7,72968	
WC	20	53	79,8868	-2,06	9,05254	0,239
	36	53	77,8302		8,80720	
BF	20	53	30,4630	-2,93	7,20283	0,038
	36	53	27,5321		7,13695	
LBM (%)	20	53	69,5370	2,93	7,20283	0,038
	36	53	72,4679		7,13695	
TBW (%)	20	53	41,5696	0,51	4,63912	0,566
	36	53	42,0755		4,39372	
BMR	20	53	1395,6826	-13,46	83,00069	0,374
	36	53	1382,2245		71,71962	
BMI	20	53	24,3743	-0,53	4,00805	0,475
	36	53	23,8411		3,63214	

FEMALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	25	79,2640	-11,89	9,70790	0,000
	18	25	67,3720		9,13362	
WC	1	25	94,9600	-10,54	7,51931	0,000
	18	25	84,4200		8,75914	
BF	1	25	42,0748	-9,15	5,16213	0,000
	18	25	32,9288		5,66755	
LBM (%)	1	25	57,9252	9,15	5,16213	0,000
	18	25	67,0712		5,66755	
TBW(%)	1	25	34,2560	3,59	2,98562	0,000
	18	25	37,8508		3,69466	
BMR	1	25	1485,7424	-114,16	97,09370	0,000
	18	25	1371,5792		93,55055	
BMI	1	25	31,2544	-4,71	4,47544	0,000
	18	25	26,5424		3,89676	

FEMALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	26	66,5885	-1,42	9,07847	0,557
	36	25	65,1640		8,06453	
WC	20	26	83,2500	-1,61	8,24773	0,480
	36	25	81,6400		7,89451	
BF	20	26	32,3277	-1,71	6,68914	0,387
	36	25	30,6136		7,34429	
LBM (%)	20	26	67,6723	1,71	6,68914	0,387
	36	25	69,3864		7,34429	
TBW (%)	20	26	38,1900	0,41	3,77455	0,698
	36	25	38,5952		3,64202	
BMR	20	26	1365,4685	-15,09	91,47278	0,539
	36	25	1350,3824		82,29160	
BMI	20	26	26,2169	-0,52	3,91391	0,625
	36	25	25,6936		3,67781	

Males
18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	2	99,65	-6,15	6,15	0,524
	18	2	93,50		9,19	
WC	1	2	104,00	-11,00	0,00	0,318
	18	2	93,00		8,49	
BF	1	2	40,50	-2,74	1,05	0,313
	18	2	37,77		2,69	
LBM (%)	1	2	59,50	2,74	1,05	0,313
	18	2	62,24		2,69	
TBW(%)	1	2	43,44	2,00	0,77	0,313
	18	2	45,43		1,97	
BMR	1	2	2200,01	-84,26	81,45	0,515
	18	2	2115,75		123,11	
BMI	1	2	29,74	-1,86	0,46	0,228
	18	2	27,88		1,46	

Males
18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	2	91,50	-3,50	9,19	0,713
	36	2	88,00		7,07	
WC	20	2	91,50	-3,50	7,78	0,662
	36	2	88,00		5,66	
BF	20	2	36,83	-1,67	2,85	0,576
	36	2	35,16		2,04	
LBM (%)	20	2	63,18	1,67	2,85	0,576
	36	2	64,85		2,04	
TBW(%)	20	2	46,12	1,22	2,08	0,575
	36	2	47,34		1,48	
BMR	20	2	2088,35	-47,95	123,11	0,707
	36	2	2040,40		94,05	
BMI	20	2	27,28	-1,03	1,48	0,505
	36	2	26,25		0,89	

MALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	11	85,9000	-7,90		
	18		78,0000			
WC	1	11	101,0000	-10,00		
	18		91,0000			
BF	1	11	38,8300	-4,23		
	18		34,6000			
LBM (%)	1	11	61,1700	4,23		
	18		65,4000			
TBW(%)	1	11	44,6500	3,09		
	18		47,7400			
BMR	1	11	1913,8300	-108,23		
	18		1805,6000			
BMI	1	11	28,0500	-2,58		
	18		25,4700			

MALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	11	78,0000	0,00		
	36		78,0000			
WC	20	11	91,0000	0,00		
	36		91,0000			
BF	20	11	34,6000	0,00		
	36		34,6000			
LBM (%)	20	11	65,4000	0,00		
	36		65,4000			
TBW(%)	20	11	47,7400	0,00		
	36		47,7400			
BMR	20	11	1805,6000	0,00		
	36		1805,6000			
BMI	20	11	25,4700	0,00		
	36		25,4700			

MALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	3	89,2667	-7,33	7,87485	0,293
	18	3	81,9333		6,92917	
WC	1	3	108,3333	-13,33	11,93035	0,183
	18	3	95,0000		5,56776	
BF	1	3	39,3033	-1,51	4,83521	0,681
	18	3	37,7933		3,28518	
LBM (%)	1	3	60,6967	1,51	4,83521	0,681
	18	3	62,2067		3,28518	
TBW(%)	1	3	41,3800	2,42	,52048	0,004
	18	3	43,8000		,39887	
BMR	1	3	1845,8200	-100,47	147,63623	0,434
	18	3	1745,3533		135,43956	
BMI	1	3	30,2433	-2,48	,48993	0,004
	18	3	27,7667		,28919	

MALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	3	81,6000	0,00	6,59394	1,000
	36	3	81,6000		6,59394	
WC	20	3	95,3333	0,00	5,68624	1,000
	36	3	95,3333		5,68624	
BF	20	3	33,6467	6,25	4,54429	0,142
	36	3	39,8933		3,70191	
LBM (%)	20	3	66,3533	-6,25	4,54429	0,142
	36	3	60,1067		3,70191	
TBW(%)	20	3	43,9167	0,00	,53613	1,000
	36	3	43,9167		,53613	
BMR	20	3	1740,7867	0,00	130,039633	1,000
	36	3	1740,7867		130,039633	
BMI	20	3	27,6600	0,00	,36865	1,000
	36	3	27,6600		,36865	

FEMALES 18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	11	71,1000	-7,20		
	18	1	63,9000			
WC	1	11	76,0000	-9,00		
	18	1	67,0000			
BF	1	11	30,7000	-3,50		
	18	1	27,2000			
LBM (%)	1	11	69,3000	3,50		
	18	1	72,8000			
TBW(%)	1	11	40,8000	3,00		
	18	1	43,8000			
BMR	1	11	1520,6600	-69,12		
	18	1	1451,5400			
BMI	1	11	25,4900	-2,58		
	18	1	22,9100			

FEMALES 18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	11	62,0000	0,00		
	36	1	62,0000			
WC	20	11	65,0000	0,00		
	36	1	65,0000			
BF	20	11	38,7600	0,00		
	36	1	38,7600			
LBM (%)	20	11	61,2400	0,00		
	36	1	61,2400			
TBW(%)	20	11	44,7000	0,00		
	36	1	44,7000			
BMR	20	11	1433,3000	0,00		
	36	1	1433,3000			
BMI	20	11	22,2300	0,00		
	36	1	22,2300			

FEMALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	6	57,1167	-4,20	5,21974	0,154
	18	6	52,9167		4,10970	
WC	1	6	70,1667	-4,17	4,95648	0,116
	18	6	66,0000		3,03315	
BF	1	6	26,5167	-1,84	5,36038	0,585
	18	6	24,6800		5,90478	
LBM (%)	1	6	73,4833	1,84	5,36038	0,585
	18	6	75,3200		5,90478	
TBW(%)	1	6	45,1417	2,40	2,42969	0,105
	18	6	47,5417		2,23167	
BMR	1	6	1350,0533	-40,32	58,08944	0,231
	18	6	1309,7333		51,22380	
BMI	1	6	21,3850	-1,56	1,49694	0,080
	18	6	19,8267		1,25707	

FEMALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	6	52,8333	0,00	4,26224	1,000
	36	6	52,8333		4,26224	
WC	20	6	65,6667	0,00	3,20416	1,000
	36	6	65,6667		3,20416	
BF	20	6	28,4717	5,02	7,61829	0,177
	36	6	33,4917		2,62479	
LBM (%)	20	6	71,5283	-5,02	7,61829	0,177
	36	6	66,5083		2,62479	
TBW(%)	20	6	47,5833	0,00	2,31989	1,000
	36	6	47,5833		2,31989	
BMR	20	6	1308,1500	0,00	52,65574	1,000
	36	6	1308,1500		52,65574	
BMI	20	6	19,7933	0,00	1,28296	1,000
	36	6	19,7933		1,28296	

FEMALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	3	60,4000	-7,07	11,88234	0,464
	18	3	53,3333		9,23760	
WC	1	3	77,0000	-10,33	7,00000	0,147
	18	3	66,6667		7,09460	
BF	1	3	28,7333	7,36	4,00791	0,484
	18	3	36,0967		14,83378	
LBM (%)	1	3	71,2667	-7,36	4,00791	0,484
	18	3	63,9033		14,83378	
TBW(%)	1	3	38,7933	3,17	2,63648	0,225
	18	3	41,9600		2,76462	
BMR	1	3	1306,4400	-67,84	138,13567	0,547
	18	3	1238,6000		112,22571	
BMI	1	3	25,1000	-2,91	3,12524	0,273
	18	3	22,1933		2,36775	

FEMALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	3	53,0000	-1,00	8,66025	0,884
	36	3	52,0000		6,92820	
WC	20	3	66,3333	-1,00	6,65833	0,851
	36	3	65,3333		5,50757	
BF	20	3	30,7633	10,98	12,58177	0,267
	36	3	41,7433		3,01102	
LBM (%)	20	3	69,2367	-10,98	12,58177	0,267
	36	3	58,2567		3,01102	
TBW(%)	20	3	42,0967	0,43	2,60634	0,838
	36	3	42,5267		2,20214	
BMR	20	3	1235,4000	-9,60	106,75903	0,911
	36	3	1225,8000		90,41443	
BMI	20	3	22,0633	-0,38	2,16408	0,818
	36	3	21,6800		1,59747	

GOOD RESULTS / CONTROL

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MALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	55	95,0200	-12,40	9,29016	0,039
	18		82,6200		6,37354	
WC	1	55	104,8000	-17,00	9,03881	0,014
	18		87,8000		7,91833	
BF	1	55	30,1800	1,94	5,55986	0,600
	18		32,1180		5,65083	
LBM (%)	1	55	69,8200	-1,94	5,55986	0,600
	18		67,8820		5,65083	
TBW(%)	1	55	42,8620	4,20	3,02182	0,055
	18		47,0660		2,91121	
BMR	1	55	2028,8540	-169,88	152,30011	0,082
	18		1858,9740		110,99270	
BMI	1	55	29,7060	-3,88	3,39807	0,071
	18		25,8260		2,40312	

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MALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	55	82,1800	-2,24	5,90864	0,532
	36		79,9400		4,88037	
WC	20	55	87,0000	-3,00	7,10634	0,569
	36		84,0000		8,74643	
BF	20	55	31,4520	-1,52	6,29277	0,767
	36		29,9360		9,04213	
LBM (%)	20	55	68,5480	1,52	6,29277	0,767
	36		70,0640		9,04213	
TBW(%)	20	55	47,2180	0,86	2,70380	0,584
	36		48,0760		1,98557	
BMR	20	55	1852,9460	-30,69	107,29487	0,666
	36		1822,2580		109,22975	
BMI	20	55	25,6840	-0,71	2,21279	0,594
	36		24,9740		1,76796	

FEMALES 18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	99	66,0000	-8,93	14,66936	0,127
	18		57,0667		7,14475	
WC	1	99	80,8889	-6,44	12,74210	0,207
	18		74,4444		6,98411	
BF	1	99	27,3556	-0,57	9,75001	0,885
	18		26,7822		6,44623	
LBM (%)	1	99	72,6444	0,57	9,75001	0,885
	18		73,2178		6,44623	
TBW(%)	1	99	41,6692	3,52	5,19459	0,112
	18		45,1936		3,45084	
BMR	1	99	1474,6444	-86,28	142,15576	0,131
	18		1388,3622		72,05272	
BMI	1	99	25,7033	-3,49	5,61820	0,116
	18		22,2111		2,45106	

FEMALES 18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	99	56,5556	-1,66	6,60362	0,597
	36		54,9000		6,43331	
WC	20	99	74,1111	-3,67	7,13170	0,253
	36		70,4444		5,89727	
BF	20	99	27,6156	2,91	7,17643	0,434
	36		30,5256		8,18110	
LBM (%)	20	99	72,3844	-2,91	7,17643	0,434
	36		69,4744		8,18110	
TBW(%)	20	99	45,4392	0,93	3,38461	0,573
	36		46,3694		3,46892	
BMR	20	99	1383,4556	-16,42	66,48388	0,607
	36		1367,0400		66,18103	
BMI	20	99	22,0189	-0,64	2,33217	0,571
	36		21,3811		2,35023	

FEMALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	14	70,8429	-9,02	12,14507	0,031
	18	14	61,8214		8,20086	
WC	1	14	83,7143	-9,79	13,85879	0,040
	18	14	73,9286		9,49060	
BF	1	14	35,6793	-0,28	7,06317	0,923
	18	14	35,3964		8,30455	
LBM (%)	1	14	64,3207	0,28	7,06317	0,923
	18	14	64,6036		8,30455	
TBW(%)	1	14	39,6693	3,33	4,61364	0,046
	18	14	42,9971		3,70868	
BMR	1	14	1488,1129	-86,61	120,23080	0,037
	18	14	1401,5071		83,94011	
BMI	1	14	26,8043	-3,45	4,89152	0,036
	18	14	23,3593		3,08450	

FEMALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	14	61,1357	-3,11	7,49909	0,258
	36	14	58,0286		6,70206	
WC	20	14	74,0000	-4,79	8,43983	0,108
	36	14	69,2143		6,65847	
BF	20	14	38,6057	-2,66	7,37496	0,388
	36	14	35,9486		8,60163	
LBM (%)	20	14	61,3943	2,66	7,37496	0,388
	36	14	64,0514		8,60163	
TBW(%)	20	14	43,2429	1,47	3,38362	0,234
	36	14	44,7157		3,00558	
BMR	20	14	1394,9243	-29,83	78,10398	0,301
	36	14	1365,0957		71,26432	
BMI	20	14	23,0957	-1,18	2,76546	0,232
	36	14	21,9114		2,33325	

FEMALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	55	76,2600	-10,38	12,80344	0,172
	18		65,8800		8,17784	
WC	1	55	89,2000	-10,80	9,62808	0,067
	18		78,4000		4,72229	
BF	1	55	36,7000	-1,74	5,09804	0,755
	18		34,9600		10,72534	
LBM (%)	1	55	63,3000	1,74	5,09804	0,755
	18		65,0400		10,72534	
TBW(%)	1	55	35,6960	3,14	3,47547	0,154
	18		38,8320		2,74140	
BMR	1	55	1469,7360	-99,65	125,86655	0,187
	18		1370,0880		86,26446	
BMI	1	55	29,4700	-4,01	4,26309	0,117
	18		25,4640		2,55055	

FEMALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	55	64,7400	-3,98	7,65101	0,384
	36		60,7600		5,83978	
WC	20	55	77,6000	-5,40	4,15933	0,079
	36		72,2000		4,32435	
BF	20	55	39,8540	2,22	5,69922	0,477
	36		42,0780		3,30307	
LBM (%)	20	55	60,1460	-2,22	5,69922	0,477
	36		57,9220		3,30307	
TBW(%)	20	55	39,2400	1,53	2,66480	0,336
	36		40,7740		2,00118	
BMR	20	55	1359,1440	-38,21	81,91391	0,450
	36		1320,9360		69,34254	
BMI	20	55	25,0300	-1,54	2,39350	0,260
	36		23,4860		1,45801	

BAD RESULTS
/CONTROL

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MALES 18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	99	98,0444	-4,16	10,46460	0,419
	18		93,8889		10,76388	
WC	1	99	114,2222	-4,11	2,77389	0,093
	18		110,1111		6,11237	
BF	1	99	38,2011	-1,83	5,50089	0,547
	18		36,3756		6,99416	
LBM (%)	1	99	61,7989	1,83	5,50089	0,547
	18		63,6244		6,99416	
TBW(%)	1	99	41,5567	1,25	2,04175	0,244
	18		42,8033		2,31843	
BMR	1	99	2126,0978	-56,93	164,40321	0,477
	18		2069,1667		167,61926	
BMI	1	99	31,9444	-1,36	2,34468	0,247
	18		30,5811		2,47172	

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	99	93,5000	-0,39	11,18593	0,944
	36		93,1111		11,74143	
WC	20	99	109,7778	-1,22	7,01388	0,760
	36		108,5556		9,46191	
BF	20	99	36,1122	-0,74	7,25565	0,844
	36		35,3756		8,31885	
LBM (%)	20	99	63,8878	0,74	7,25565	0,844
	36		64,6244		8,31885	
TBW(%)	20	99	42,9500	0,17	2,50580	0,896
	36		43,1189		2,87059	
BMR	20	99	2063,8389	-5,33	173,03616	0,950
	36		2058,5111		179,48784	
BMI	20	99	30,4478	-0,12	2,60164	0,924
	36		30,3233		2,87345	

MALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	181	94,9833	-3,68	11,35172	0,253
	18	181	91,3056		7,08416	
WC	1	181	114,5556	-6,39	7,07292	0,016
	18	181	108,1667		8,03119	
BF	1	181	39,8983	1,99	5,76730	0,273
	18	181	41,8889		4,92411	
LBM (%)	1	181	60,1017	-1,99	5,76730	0,273
	18	181	58,1111		4,92411	
TBW(%)	1	181	40,5461	0,88	2,69775	0,261
	18	181	41,4256		1,82715	
BMR	1	181	1990,1161	-50,39	173,02847	0,322
	18	181	1939,7306		122,75282	
BMI	1	181	32,4517	-1,26	3,66216	0,218
	18	181	31,1950		2,11602	

MALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	181	91,0833	-0,55	7,09244	0,810
	36	181	90,5333		6,49452	
WC	20	181	107,7778	-2,11	8,29993	0,527
	36	181	105,6667		11,25637	
BF	20	181	41,8689	0,49	4,80359	0,741
	36	181	42,3633		4,04923	
LBM (%)	20	181	58,1311	-0,49	4,80359	0,741
	36	181	57,6367		4,04923	
TBW(%)	20	181	41,4939	0,16	1,85258	0,802
	36	181	41,6550		1,97184	
BMR	20	181	1936,6861	-7,54	122,21032	0,847
	36	181	1929,1511		110,69632	
BMI	20	181	31,1194	-0,17	2,13308	0,820
	36	181	30,9528		2,23417	

MALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	18	97,7778	-3,42	9,78466	0,305
	18	18	94,3556		9,91394	
WC	1	18	112,6111	-3,61	9,10164	0,268
	18	18	109,0000		10,12278	
BF	1	18	38,6261	-0,28	6,67101	0,911
	18	18	38,3444		8,30540	
LBM (%)	1	18	61,3739	0,28	6,67101	0,911
	18	18	61,6556		8,30540	
TBW(%)	1	18	39,1978	0,88	2,31941	0,226
	18	18	40,0767		1,93639	
BMR	1	18	1958,8000	-46,88	154,93001	0,384
	18	18	1911,9156		163,68186	
BMI	1	18	33,0617	-1,21	2,97248	0,182
	18	18	31,8511		2,32357	

MALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	18	94,0833	-2,76	9,93806	0,428
	36	18	91,3278		10,65628	
WC	20	18	108,6111	-4,11	10,38177	0,286
	36	18	104,5000		12,29180	
BF	20	18	38,2822	-0,93	8,42720	0,751
	36	18	37,3483		9,05027	
LBM (%)	20	18	61,7178	0,93	8,42720	0,751
	36	18	62,6517		9,05027	
TBW(%)	20	18	40,1506	0,83	1,87815	0,229
	36	18	40,9833		2,18735	
BMR	20	18	1908,1861	-37,75	164,30380	0,470
	36	18	1870,4350		171,05428	
BMI	20	18	31,7528	-0,94	2,26115	0,246
	36	18	30,8094		2,52506	

FEMALES 18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	99	84,6667	-7,77	13,81249	0,179
	18		76,9000		8,91488	
WC	1	99	95,5556	-6,00	12,22816	0,316
	18		89,5556		12,35021	
BF	1	99	44,3211	-0,10	9,17892	0,980
	18		44,2222		6,76381	
LBM (%)	1	99	55,6789	0,10	9,17892	0,980
	18		55,7778		6,76381	
TBW(%)	1	99	35,9278	2,00	3,72948	0,262
	18		37,9311		3,57896	
BMR	1	99	1657,4444	-74,56	127,29521	0,151
	18		1582,8844		72,00882	
BMI	1	99	32,2311	-2,90	5,43509	0,228
	18		29,3333		4,27789	

FEMALES 18-25

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	99	76,6222	-0,76	9,03227	0,869
	36		75,8667		10,00187	
WC	20	99	89,0000	-0,56	12,76715	0,930
	36		88,4444		13,55647	
BF	20	99	45,4933	-3,78	6,05518	0,357
	36		41,7167		10,19452	
LBM (%)	20	99	54,5067	3,78	6,05518	0,357
	36		58,2833		10,19452	
TBW(%)	20	99	38,0200	0,32	3,65595	0,862
	36		38,3400		4,01051	
BMR	20	99	1579,6956	-7,25	72,97390	0,846
	36		1572,4422		82,64150	
BMI	20	99	29,2333	-0,29	4,35273	0,894
	36		28,9467		4,64935	

FEMALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	37	85,3243	-4,14	13,37440	0,163
	18	37	81,1811		11,83309	
WC	1	37	98,2703	-3,76	10,72807	0,151
	18	37	94,5135		11,52924	
BF	1	37	44,3808	-0,94	7,77798	0,632
	18	37	43,4400		8,99886	
LBM (%)	1	37	55,6192	0,94	7,77798	0,632
	18	37	56,5600		8,99886	
TBW(%)	1	37	34,5451	0,99	3,15521	0,186
	18	37	35,5384		3,24988	
BMR	1	37	1611,0000	-39,78	132,19307	0,174
	18	37	1571,2249		116,51536	
BMI	1	37	32,8857	-1,57	5,41449	0,199
	18	37	31,3170		4,98477	

FEMALES 26-40

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	39	80,8333	-1,71	11,25841	0,503
	36	39	79,1205		11,20484	
WC	20	39	94,1282	-0,92	10,53610	0,713
	36	39	93,2051		11,50327	
BF	20	39	43,6362	1,65	9,06547	0,415
	36	39	45,2831		8,68309	
LBM (%)	20	39	56,3638	-1,65	9,06547	0,415
	36	39	54,7169		8,68309	
TBW(%)	20	39	35,5367	0,49	3,14005	0,508
	36	39	36,0236		3,32683	
BMR	20	39	1564,8821	-16,44	112,27148	0,521
	36	39	1548,4390		113,17561	
BMI	20	39	31,1836	-0,64	4,75438	0,559
	36	39	30,5431		4,87431	

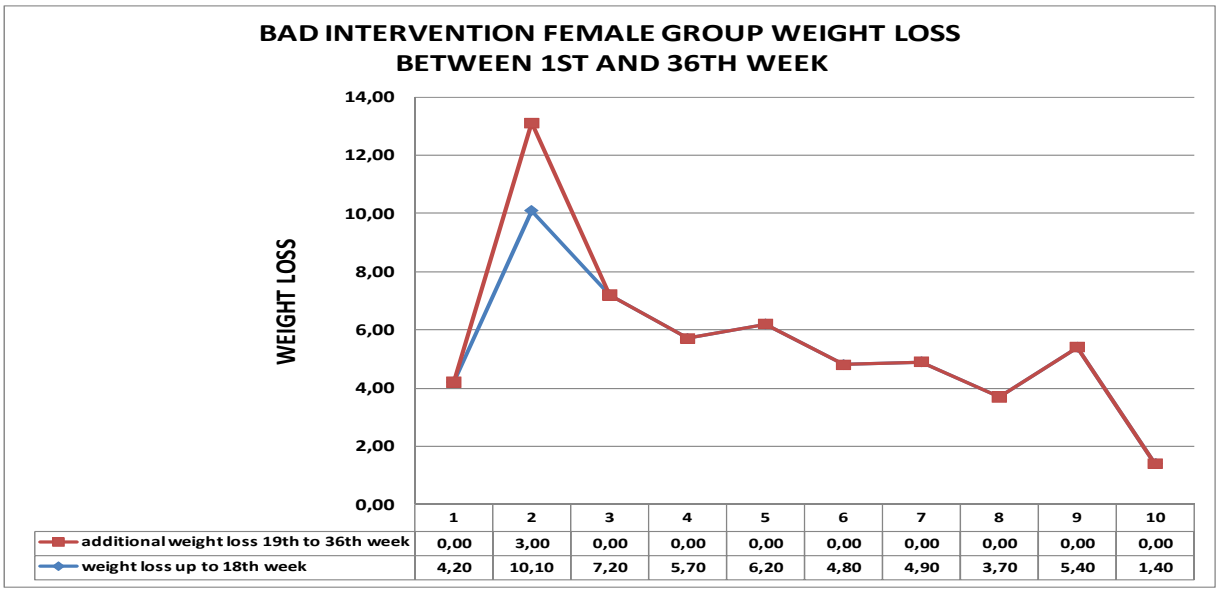
FEMALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	1	21	89,4667	-4,65	13,73795	0,280
	18	21	84,8190		13,74728	
WC	1	21	101,2381	-3,81	11,13510	0,290
	18	21	97,4286		11,89778	
BF	1	21	46,1133	0,17	5,44535	0,931
	18	21	46,2881		7,36988	
LBM (%)	1	21	53,8867	-0,17	5,44535	0,931
	18	21	53,7119		7,36988	
TBW(%)	1	21	32,4029	1,05	2,83001	0,262
	18	21	33,4505		3,12727	
BMR	1	21	1590,6514	-44,62	134,66880	0,290
	18	21	1546,0343		134,91613	
BMI	1	21	34,7300	-1,76	5,06350	0,283
	18	21	32,9705		5,41356	

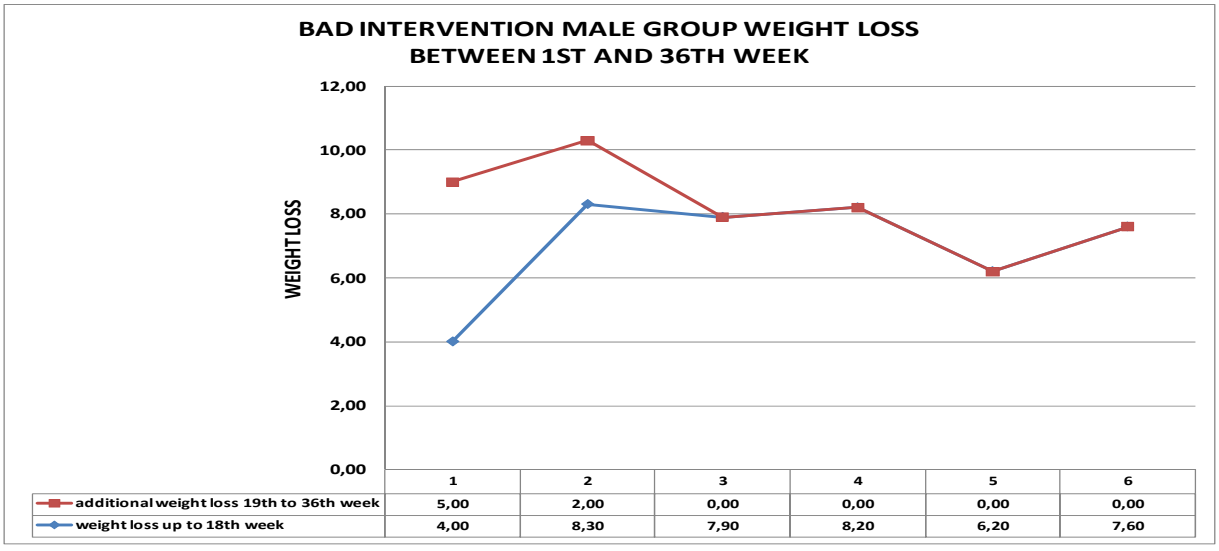
FEMALES 41-51

Variable	Week	N	Mean	Mean (difference)	Std. Deviation	t-test (p-value)
Weight	20	21	84,4095	-2,02	13,76931	0,636
	36	21	82,3905		13,69091	
WC	20	21	97,0952	-2,95	12,50962	0,464
	36	21	94,1429		13,33524	
BF	20	21	48,0105	-0,59	9,50849	0,810
	36	21	47,4224		5,75552	
LBM (%)	20	21	51,9895	0,59	9,50849	0,810
	36	21	52,5776		5,75552	
TBW(%)	20	21	33,5510	0,53	3,16789	0,611
	36	21	34,0790		3,49278	
BMR	20	21	1542,1029	-19,38	134,89805	0,641
	36	21	1522,7200		132,08693	
BMI	20	21	32,8171	-0,76	5,46350	0,661
	36	21	32,0600		5,62780	

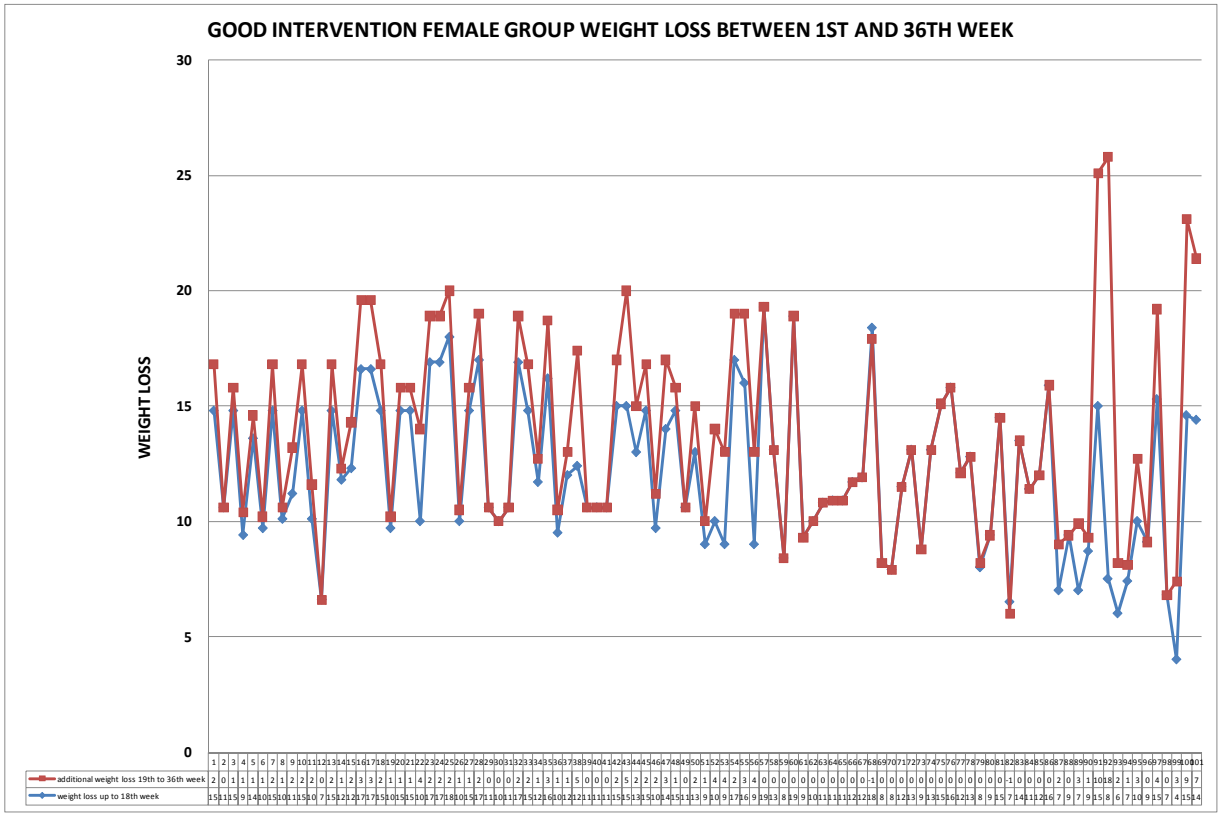
The blue line shows the weight lost the first 18 weeks and red weight lost or gained or maintained from 19 up to 36 weeks. The red is additional weight loss. If the weight is maintained from 19 to 36 weeks then the red line will be on the blue, if more weight is lost then it will be higher than the blue and if weight is gained then the red line will go under the blue.

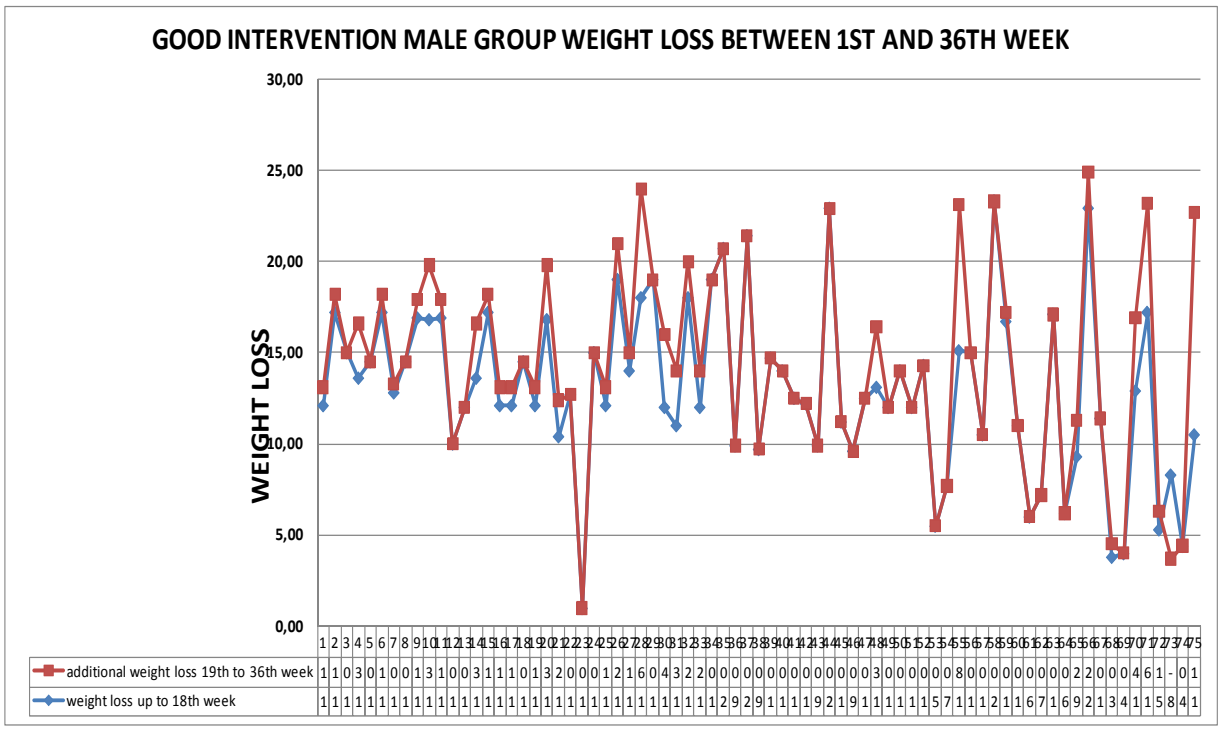


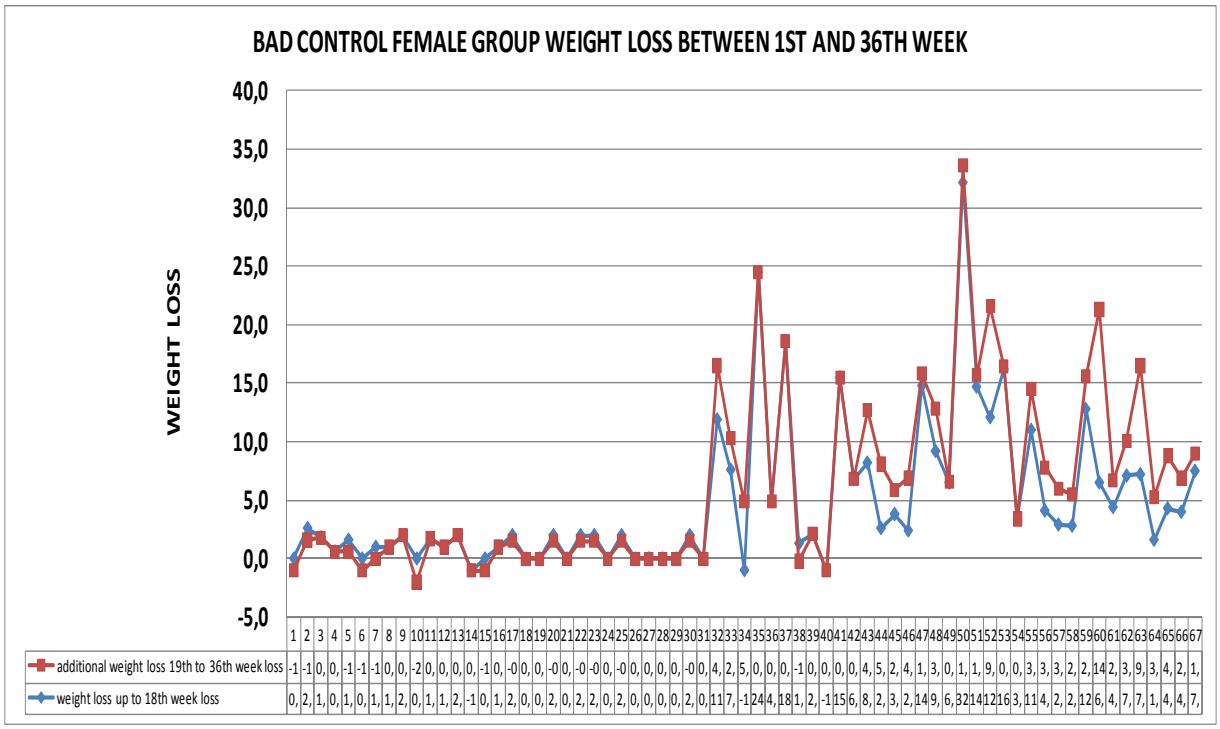
	1	2	3	4	5	6	7	8	9	10
additional weight loss 19th to 36th week	0,00	3,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
weight loss up to 18th week	4,20	10,10	7,20	5,70	6,20	4,80	4,90	3,70	5,40	1,40

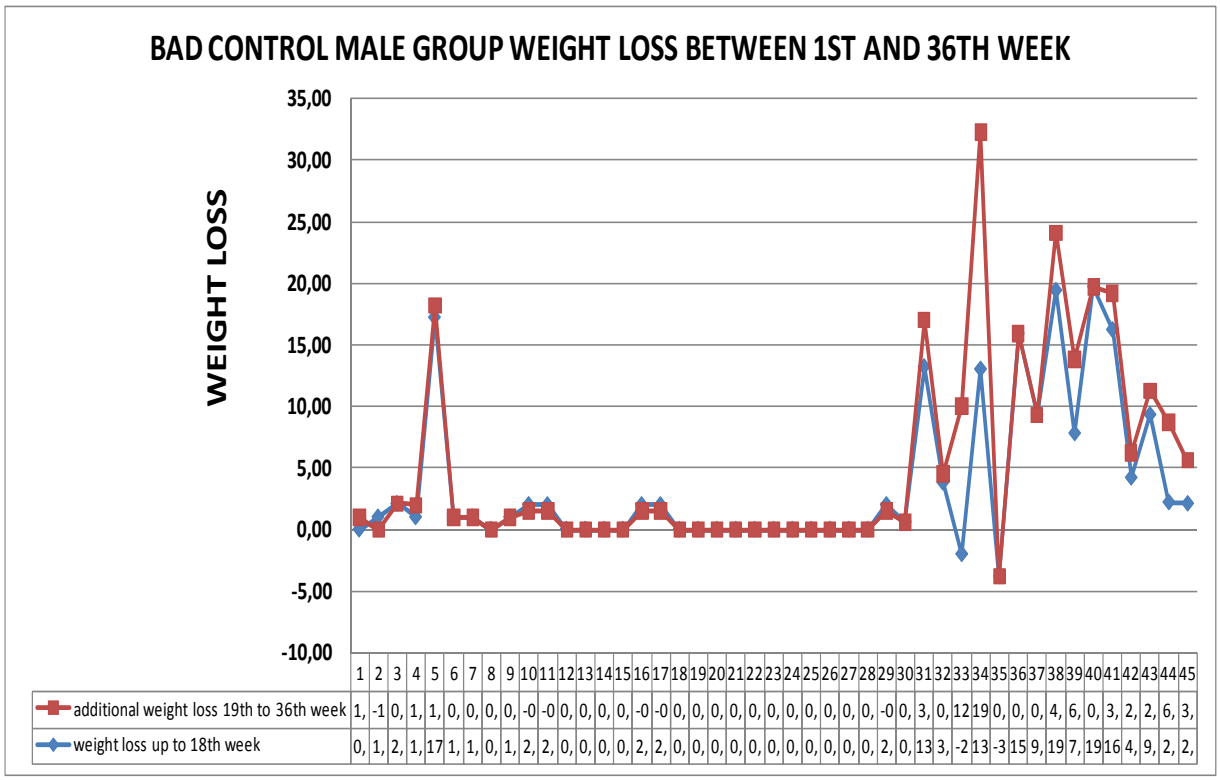


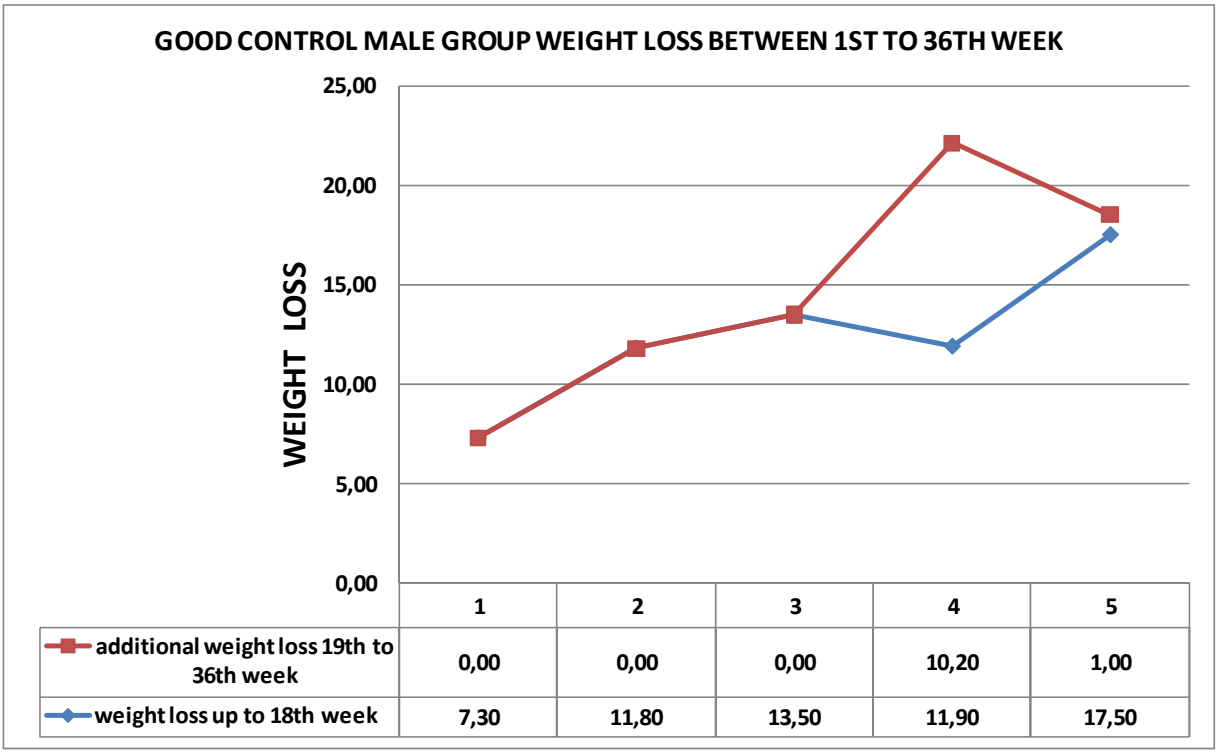
	1	2	3	4	5	6
additional weight loss 19th to 36th week	5,00	2,00	0,00	0,00	0,00	0,00
weight loss up to 18th week	4,00	8,30	7,90	8,20	6,20	7,60


GOOD INTERVENTION FEMALE GROUP WEIGHT LOSS BETWEEN 1ST AND 36TH WEEK
WEIGHT LOSS
30
25
20
15
10
5
0
additional weight loss 19th to 36th week
weight loss up to 18th week

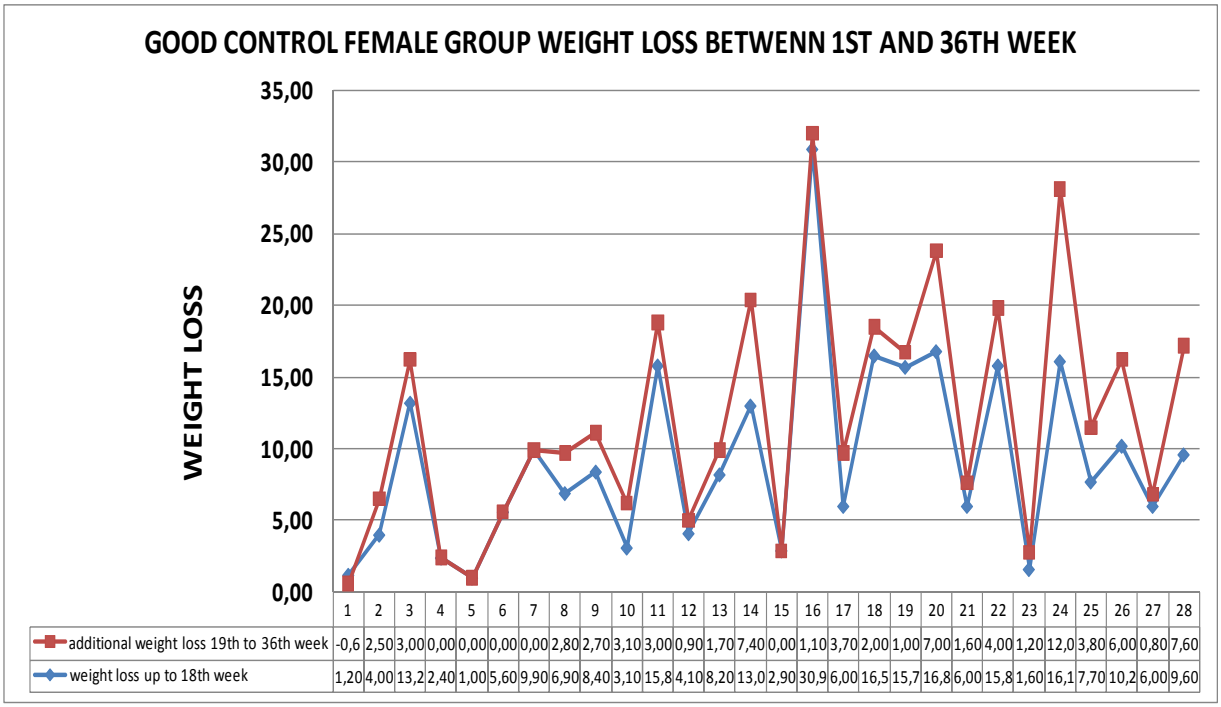

GOOD INTERVENTION MALE GROUP WEIGHT LOSS BETWEEN 1ST AND 36TH WEEK
WEIGHT LOSS
30,00
25,00
20,00
15,00
10,00
5,00
0,00
additional weight loss 19th to 36th week
weight loss up to 18th week


BAD CONTROL FEMALE GROUP WEIGHT LOSS BETWEEN 1ST AND 36TH WEEK
WEIGHT LOSS
40,0
35,0
30,0
25,0
20,0
15,0
10,0
5,0
0,0
-5,0
additional weight loss 19th to 36th week loss
weight loss up to 18th week loss


BAD CONTROL MALE GROUP WEIGHT LOSS BETWEEN 1ST AND 36TH WEEK
WEIGHT LOSS
35,00
30,00
25,00
20,00
15,00
10,00
5,00
0,00
-5,00
-10,00
additional weight loss 19th to 36th week
weight loss up to 18th week



	1	2	3	4	5
additional weight loss 19th to 36th week	0,00	0,00	0,00	10,20	1,00
weight loss up to 18th week	7,30	11,80	13,50	11,90	17,50



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
additional weight loss 19th to 36th week	-0,6	2,50	3,00	0,00	0,00	0,00	0,00	2,80	2,70	3,10	3,00	0,90	1,70	7,40	0,00	1,10	3,70	2,00	1,00	7,00	1,60	4,00	1,20	12,0	3,80	6,00	0,80	7,60
weight loss up to 18th week	1,20	4,00	13,2	2,40	1,00	5,60	9,90	6,90	8,40	3,10	15,8	4,10	8,20	13,0	2,90	30,9	6,00	16,5	15,7	16,8	6,00	15,8	1,60	16,1	7,70	10,2	6,00	9,60

Correlation scoring for checklist *(Checklist A)*

Week 1 scores

	r value	Interpretation	Significance
Age	-0.023	Low Negative	0.771
Gender	0.269	Low positive	0.001

Week 2 scores

	r value	Interpretation	Significance
Age	0.223	Low positive	0.005
Gender	0.074	Low positive	0.354

Week 3

	r value	Interpretation	Significance
Age	-0.008	Low negative	0.918
Gender	0.085	Low positive	0.286

Nutritional Content of Diet Recall

	Males		Females	
	Standard	Actual (Mean)	Standard	Actual (Mean)
Protein	58	71.6	46	64.7
Calcium	1000	724.9	1000	730.3
Iron	10	10.6	15	9.3
Magnesium	400	232.6	310	202.7
Vitamin A	1000	640.4	800	606.9
Vitamin C	60	78.0	60	64.2
Vitamin B1	1.5	1.3	1.1	1.1
Vitamin B2	1.7	1.4	1.3	1.3
Vitamin B6	2.0	1.3	1.6	1.1

Linear Regression for Checklists

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	19.023	3.279		5.801	.000
	Total_A_1	.127	.051	.198	2.491	.014
	Total_B_1	.420	.548	.061	.767	.444
	totalC1	-.466	.356	-.103	-1.309	.192
	totalD1	.063	.119	.042	.533	.595

a Dependent Variable: weightdiff.1.18

R-square=,051

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	1.569	2.161		.726	.469
	Total_A_36	.032	.020	.127	1.596	.112
	Total_B_36	-.011	.336	-.003	-.034	.973
	totalC36	-.528	.228	-.183	-2.315	.022
	totalD36	.360	.378	.075	.952	.343

a Dependent Variable: weightdiff.18.36

R-square=,052

Appendix 5 - Dietary Reference Intakes (DRIs)

Dietary Reference Intakes (DRIs): Recommended Intakes for Individuals, Vitamins
Food and Nutrition Board, Institute of Medicine, National Academies

Life Stage Group	Vit A (µg/d)[a]	Vit C (mg/d)	Vit D (µg/d)[b,c]	Vit E (mg/d) [d]	Vit K (µg/d)	Thia-min (mg/d)	Ribo-flavin (mg/d)	Niacin (mg/d)[e]	Vit B6 (mg/d)	Folate (µg/d)[f]	Vit B_{12} (µg/d)	Panto-thenic Acid (mg/d)	Biotin (µg/d)	Choline[g] (mg/d)
Infants														
0–6 mo	400*	40*	5*	4*	2.0*	0.2*	0.3*	2*	0.1*	65*	0.4*	1.7*	5*	125*
7–12 mo	500*	50*	5*	5*	2.5*	0.3*	0.4*	4*	0.3*	80*	0.5*	1.8*	6*	150*
Children														
1–3 y	**300**	**15**	5*	**6**	30*	**0.5**	**0.5**	**6**	**0.5**	**150**	**0.9**	2*	8*	200*
4–8 y	**400**	**25**	5*	**7**	55*	**0.6**	**0.6**	**8**	**0.6**	**200**	**1.2**	3*	12*	250*
Males														
9–13 y	**600**	**45**	5*	**11**	60*	**0.9**	**0.9**	**12**	**1.0**	**300**	**1.8**	4*	20*	375*
14–18 y	**900**	**75**	5*	**15**	75*	**1.2**	**1.3**	**16**	**1.3**	**400**	**2.4**	5*	25*	550*
19–30 y	**900**	**90**	5*	**15**	120*	**1.2**	**1.3**	**16**	**1.3**	**400**	**2.4**	5*	30*	550*
31–50 y	**900**	**90**	5*	**15**	120*	**1.2**	**1.3**	**16**	**1.3**	**400**	**2.4**	5*	30*	550*
51–70 y	**900**	**90**	10*	**15**	120*	**1.2**	**1.3**	**16**	**1.7**	**400**	**2.4**[i]	5*	30*	550*
> 70 y	**900**	**90**	15*	**15**	120*	**1.2**	**1.3**	**16**	**1.7**	**400**	**2.4**[i]	5*	30*	550*
Females														
9–13 y	**600**	**45**	5*	**11**	60*	**0.9**	**0.9**	**12**	**1.0**	**300**	**1.8**	4*	20*	375*
14–18 y	**700**	**65**	5*	**15**	75*	**1.0**	**1.0**	**14**	**1.2**	**400**[i]	**2.4**	5*	25*	400*
19–30 y	**700**	**75**	5*	**15**	90*	**1.1**	**1.1**	**14**	**1.3**	**400**[i]	**2.4**	5*	30*	425*
31–50 y	**700**	**75**	5*	**15**	90*	**1.1**	**1.1**	**14**	**1.3**	**400**[i]	**2.4**	5*	30*	425*
51–70 y	**700**	**75**	10*	**15**	90*	**1.1**	**1.1**	**14**	**1.5**	**400**	**2.4**[h]	5*	30*	425*
> 70 y	**700**	**75**	15*	**15**	90*	**1.1**	**1.1**	**14**	**1.5**	**400**	**2.4**[h]	5*	30*	425*
Pregnancy														
14–18 y	**750**	**80**	5*	**15**	75*	**1.4**	**1.4**	**18**	**1.9**	**600**[j]	**2.6**	6*	30*	450*
19–30 y	**770**	**85**	5*	**15**	90*	**1.4**	**1.4**	**18**	**1.9**	**600**[j]	**2.6**	6*	30*	450*
31–50 y	**770**	**85**	5*	**15**	90*	**1.4**	**1.4**	**18**	**1.9**	**600**[j]	**2.6**	6*	30*	450*
Lactation														
14–18 y	**1,200**	**115**	5*	**19**	75*	**1.4**	**1.6**	**17**	**2.0**	**500**	**2.8**	7*	35*	550*
19–30 y	**1,300**	**120**	5*	**19**	90*	**1.4**	**1.6**	**17**	**2.0**	**500**	**2.8**	7*	35*	550*
31–50 y	**1,300**	**120**	5*	**19**	90*	**1.4**	**1.6**	**17**	**2.0**	**500**	**2.8**	7*	35*	550*

NOTE: This table (taken from the DRI reports, see www.nap.edu) presents Recommended Dietary Allowances (RDAs) in **bold type** and Adequate Intakes (AIs) in ordinary type followed by an asterisk (*). RDAs and AIs may both be used as goals for individual intake. RDAs are set to meet the needs of almost all (97 to 98 percent) individuals in a group. For healthy breastfed infants, the AI is the mean intake. The AI for other life stage and gender groups is believed to cover needs of all individuals in the group, but lack of data or uncertainty in the data prevent being able to specify with confidence the percentage of individuals covered by this intake.

[a]As retinol activity equivalents (RAEs). 1 RAE = 1 µg retinol, 12 µg β-carotene, 24 µg α-carotene, or 24 µg β-cryptoxanthin. The RAE for dietary provitamin A carotenoids is twofold greater than retinol equivalents (RE), whereas the RAE for preformed vitamin A is the same as RE.

[b]As cholecalciferol. 1 µg cholecalciferol = 40 IU vitamin D.

[c]In the absence of adequate exposure to sunlight.

[d]As α-tocopherol. α-Tocopherol includes *RRR*-α-tocopherol, the only form of α-tocopherol that occurs naturally in foods, and the *2R*-stereoisomeric forms of α-tocopherol (*RRR*-, *RSR*-, *RRS*-, and *RSS*-α-tocopherol) that occur in fortified foods and supplements. It does not include the *2S*-stereoisomeric forms of α-tocopherol (*SRR*-, *SSR*-, *SRS*-, and *SSS*-α-tocopherol), also found in fortified foods and supplements.

[e]As niacin equivalents (NE). 1 mg of niacin = 60 mg of tryptophan; 0–6 months = preformed niacin (not NE).

[f] As dietary folate equivalents (DFE). 1 DFE = 1 µg food folate = 0.6 µg of folic acid from fortified food or as a supplement consumed with food = 0.5 µg of a supplement taken on an empty stomach.

[g]Although AIs have been set for choline, there are few data to assess whether a dietary supply of choline is needed at all stages of the life cycle, and it may be that the choline requirement can be met by endogenous synthesis at some of these stages.

[h]Because 10 to 30 percent of older people may malabsorb food-bound B_{12}, it is advisable for those older than 50 years to meet their RDA mainly by consuming foods fortified with B_{12} or a supplement containing B_{12}.

[i]In view of evidence linking folate intake with neural tube defects in the fetus, it is recommended that all women capable of becoming pregnant consume 400 µg from supplements or fortified foods in addition to intake of food folate from a varied diet.

[j]It is assumed that women will continue consuming 400 µg from supplements or fortified food until their pregnancy is confirmed and they enter prenatal care, which ordinarily occurs after the
end of the periconceptional period—the critical time for formation of the neural tube.

Dietary Reference Intakes (DRIs): Recommended Intakes for Individuals, Elements

Food and Nutrition Board, Institute of Medicine, National Academies

Life Stage Group	Calcium (mg/d)	Chromium (µg/d)	Copper (µg/d)	Fluoride (mg/d)	Iodine (µg/d)	Iron (mg/d)	Magnesium (mg/d)	Manganese (mg/d)	Molybdenum (µg/d)	Phosphorus (mg/d)	Selenium (µg/d)	Zinc (mg/d)	Potassium (g/d)	Sodium (g/d)	Chloride (g/d)
Infants															
0–6 mo	210*	0.2*	200*	0.01*	110*	0.27*	30*	0.003*	2*	100*	15*	2*	0.4*	0.12*	0.18*
7–12 mo	270*	5.5*	220*	0.5*	130*	**11**	75*	0.6*	3*	275*	20*	**3**	0.7*	0.37*	0.57*
Children															
1–3 y	500*	11*	**340**	0.7*	**90**	**7**	**80**	1.2*	**17**	**460**	**20**	**3**	3.0*	1.0*	1.5*
4–8 y	800*	15*	**440**	1*	**90**	**10**	**130**	1.5*	**22**	**500**	**30**	**5**	3.8*	1.2*	1.9*
Males															
9–13 y	1,300*	25*	**700**	2*	**120**	**8**	**240**	1.9*	**34**	**1,250**	**40**	**8**	4.5*	1.5*	2.3*
14–18 y	1,300*	35*	**890**	3*	**150**	**11**	**410**	2.2*	**43**	**1,250**	**55**	**11**	4.7*	1.5*	2.3*
19–30 y	1,000*	35*	**900**	4*	**150**	**8**	**400**	2.3*	**45**	**700**	**55**	**11**	4.7*	1.5*	2.3*
31–50 y	1,000*	35*	**900**	4*	**150**	**8**	**420**	2.3*	**45**	**700**	**55**	**11**	4.7*	1.5*	2.3*
51–70 y	1,200*	30*	**900**	4*	**150**	**8**	**420**	2.3*	**45**	**700**	**55**	**11**	4.7*	1.3*	2.0*
> 70 y	1,200*	30*	**900**	4*	**150**	**8**	**420**	2.3*	**45**	**700**	**55**	**11**	4.7*	1.2*	1.8*
Females															
9–13 y	1,300*	21*	**700**	2*	**120**	**8**	**240**	1.6*	**34**	**1,250**	**40**	**8**	4.5*	1.5*	2.3*
14–18 y	1,300*	24*	**890**	3*	**150**	**15**	**360**	1.6*	**43**	**1,250**	**55**	**9**	4.7*	1.5*	2.3*
19–30 y	1,000*	25*	**900**	3*	**150**	**18**	**310**	1.8*	**45**	**700**	**55**	**8**	4.7*	1.5*	2.3*
31–50 y	1,000*	25*	**900**	3*	**150**	**18**	**320**	1.8*	**45**	**700**	**55**	**8**	4.7*	1.5*	2.3*
51–70 y	1,200*	20*	**900**	3*	**150**	**8**	**320**	1.8*	**45**	**700**	**55**	**8**	4.7*	1.3*	2.0*
> 70 y	1,200*	20*	**900**	3*	**150**	**8**	**320**	1.8*	**45**	**700**	**55**	**8**	4.7*	1.2*	1.8*
Pregnancy															
14–18 y	1,300*	29*	**1,000**	3*	**220**	**27**	**400**	2.0*	**50**	**1,250**	**60**	**12**	4.7*	1.5*	2.3*
19–30 y	1,000*	30*	**1,000**	3*	**220**	**27**	**350**	2.0*	**50**	**700**	**60**	**11**	4.7*	1.5*	2.3*
31–50 y	1,000*	30*	**1,000**	3*	**220**	**27**	**360**	2.0*	**50**	**700**	**60**	**11**	4.7*	1.5*	2.3*
Lactation															
14–18 y	1,300*	44*	**1,300**	3*	**290**	**10**	**360**	2.6*	**50**	**1,250**	**70**	**13**	5.1*	1.5*	2.3*
19–30 y	1,000*	45*	**1,300**	3*	**290**	**9**	**310**	2.6*	**50**	**700**	**70**	**12**	5.1*	1.5*	2.3*
31–50 y	1,000*	45*	**1,300**	3*	**290**	**9**	**320**	2.6*	**50**	**700**	**70**	**12**	5.1*	1.5*	2.3*

NOTE: This table presents Recommended Dietary Allowances (RDAs) in **bold type** and Adequate Intakes (AIs) in ordinary type followed by an asterisk (*). RDAs and AIs may both be used as goals for individual intake. RDAs are set to meet the needs of almost all (97 to 98 percent) individuals in a group. For healthy breastfed infants, the AI is the mean intake. The AI for other life stage and gender groups is believed to cover needs of all individuals in the group, but lack of data or uncertainty in the data prevent being able to specify with confidence the percentage of individuals covered by this intake.

SOURCES: *Dietary Reference Intakes for Calcium, Phosphorous, Magnesium, Vitamin D, and Fluoride* (1997); *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin* B_6*, Folate, Vitamin* B_{12}*, Pantothenic Acid, Biotin, and Choline* (1998); *Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids* (2000); *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc* (2001); and *Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate* (2004). These reports may be accessed via http://www.nap.edu.

Dietary Reference Intakes (DRIs): Tolerable Upper Intake Levels (UL[a]), Vitamins

Food and Nutrition Board, Institute of Medicine, National Academies

Life Stage Group	Vitamin A (µg/d)[b]	Vitamin C (mg/d)	Vitamin D (µg/d)	Vitamin E (mg/d)[c,d]	Vitamin K	Thiamin	Ribo-flavin	Niacin (mg/d)[d]	Vitamin B_6 (mg/d)	Folate (µg/d)[d]	Vitamin B_{12}	Pantothenic Acid	Biotin	Choline (g/d)	Carote-noids[e]
Infants															
0–6 mo	600	ND[f]	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7–12 mo	600	ND	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Children															
1–3 y	600	400	50	200	ND	ND	ND	10	30	300	ND	ND	ND	1.0	ND
4–8 y	900	650	50	300	ND	ND	ND	15	40	400	ND	ND	ND	1.0	ND
Males, Females															
9–13 y	1,700	1,200	50	600	ND	ND	ND	20	60	600	ND	ND	ND	2.0	ND
14–18 y	2,800	1,800	50	800	ND	ND	ND	30	80	800	ND	ND	ND	3.0	ND
19–70 y	3,000	2,000	50	1,000	ND	ND	ND	35	100	1,000	ND	ND	ND	3.5	ND
> 70 y	3,000	2,000	50	1,000	ND	ND	ND	35	100	1,000	ND	ND	ND	3.5	ND
Pregnancy															
14–18 y	2,800	1,800	50	800	ND	ND	ND	30	80	800	ND	ND	ND	3.0	ND
19–50 y	3,000	2,000	50	1,000	ND	ND	ND	35	100	1,000	ND	ND	ND	3.5	ND
Lactation															
14–18 y	2,800	1,800	50	800	ND	ND	ND	30	80	800	ND	ND	ND	3.0	ND
19–50 y	3,000	2,000	50	1,000	ND	ND	ND	35	100	1,000	ND	ND	ND	3.5	ND

[a] UL = The maximum level of daily nutrient intake that is likely to pose no risk of adverse effects. Unless otherwise specified, the UL represents total intake from food, water, and supplements. Due to lack of suitable data, ULs could not be established for vitamin K, thiamin, riboflavin, vitamin B_{12}, pantothenic acid, biotin, carotenoids. In the absence of ULs, extra caution may be warranted in consuming levels above recommended intakes.

[b] As preformed vitamin A only.

[c] As α-tocopherol; applies to any form of supplemental α-tocopherol.

[d] The ULs for vitamin E, niacin, and folate apply to synthetic forms obtained from supplements, fortified foods, or a combination of the two.

[e] β-Carotene supplements are advised only to serve as a provitamin A source for individuals at risk of vitamin A deficiency. [f]

[f] ND = Not determinable due to lack of data of adverse effects in this age group and concern with regard to lack of ability to handle excess amounts. Source of intake should be from food only to prevent high levels of intake.

SOURCES: *Dietary Reference Intakes for Calcium, Phosphorous, Magnesium, Vitamin D, and Fluoride* (1997); *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B_6, Folate, Vitamin B_{12}, Pantothenic Acid, Biotin, and Choline* (1998); *Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids* (2000); and *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc* (2001). These reports may be accessed via http://www.nap.edu.

Dietary Reference Intakes (DRIs): Tolerable Upper Intake Levels (UL[a]), Elements

Food and Nutrition Board, Institute of Medicine, National Academies

Life Stage Group	Arsenic[b]	Boron (mg/d)	Calcium (g/d)	Chromium	Copper (µg/d)	Fluoride (mg/d)	Iodine (µg/d)	Iron (mg/d)	Magnesium (mg/d)[c]	Manganese (mg/d)	Molybdenum (µg/d)	Nickel (mg/d)	Phosphorus (g/d)	Potassium	Selenium (µg/d)	Silicon[d]	Sulfate	Vanadium (mg/d)[e]	Zinc (mg/d)	Sodium (g/d)	Chloride (g/d)
Infants																					
0–6 mo	ND[f]	ND	ND	ND	ND	0.7	ND	40	ND	ND	ND	ND	ND	ND	45	ND	ND	ND	4	ND	ND
7–12 mo	ND	ND	ND	ND	ND	0.9	ND	40	ND	ND	ND	ND	ND	ND	60	ND	ND	ND	5	ND	ND
Children																					
1–3 y	ND	3	2.5	ND	1,000	1.3	200	40	65	2	300	0.2	3	ND	90	ND	ND	ND	7	1.5	2.3
4–8 y	ND	6	2.5	ND	3,000	2.2	300	40	110	3	600	0.3	3	ND	150	ND	ND	ND	12	1.9	2.9
Males, Females																					
9–13 y	ND	11	2.5	ND	5,000	10	600	40	350	6	1,100	0.6	4	ND	280	ND	ND	ND	23	2.2	3.4
14–18 y	ND	17	2.5	ND	8,000	10	900	45	350	9	1,700	1.0	4	ND	400	ND	ND	ND	34	2.3	3.6
19–70 y	ND	20	2.5	ND	10,000	10	1,100	45	350	11	2,000	1.0	4	ND	400	ND	ND	1.8	40	2.3	3.6
>70 y	ND	20	2.5	ND	10,000	10	1,100	45	350	11	2,000	1.0	3	ND	400	ND	ND	1.8	40	2.3	3.6
Pregnancy																					
14–18 y	ND	17	2.5	ND	8,000	10	900	45	350	9	1,700	1.0	3.5	ND	400	ND	ND	ND	34	2.3	3.6
19–50 y	ND	20	2.5	ND	10,000	10	1,100	45	350	11	2,000	1.0	3.5	ND	400	ND	ND	ND	40	2.3	3.6
Lactation																					
14–18 y	ND	17	2.5	ND	8,000	10	900	45	350	9	1,700	1.0	4	ND	400	ND	ND	ND	34	2.3	3.6
19–50 y	ND	20	2.5	ND	10,000	10	1,100	45	350	11	2,000	1.0	4	ND	400	ND	ND	ND	40	2.3	3.6

[a] UL = The maximum level of daily nutrient intake that is likely to pose no risk of adverse effects. Unless otherwise specified, the UL represents total intake from food, water, and supplements. Due to lack of suitable data, ULs could not be established for arsenic, chromium, silicon, potassium, and sulfate. In the absence of ULs, extra caution may be warranted in consuming levels above recommended intakes.

[b] Although the UL was not determined for arsenic, there is no justification for adding arsenic to food or supplements.

[c] The ULs for magnesium represent intake from a pharmacological agent only and do not include intake from food and water.

[d] Although silicon has not been shown to cause adverse effects in humans, there is no justification for adding silicon to supplements.

[e] Although vanadium in food has not been shown to cause adverse effects in humans, there is no justification for adding vanadium to food and vanadium supplements should be used with caution. The UL is based on adverse effects in laboratory animals and this data could be used to set a UL for adults but not children and adolescents.

[f] ND = Not determinable due to lack of data of adverse effects in this age group and concern with regard to lack of ability to handle excess amounts. Source of intake should be from food only to prevent high levels of intake.

SOURCES: *Dietary Reference Intakes for Calcium, Phosphorous, Magnesium, Vitamin D, and Fluoride* (1997); *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B_6, Folate, Vitamin B_{12}, Pantothenic Acid, Biotin, and Choline* (1998); *Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids* (2000); *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc* (2001); and *Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate* (2004). These reports may be accessed via http://www.nap.edu.

Dietary Reference Intakes (DRIs): Estimated Energy Requirements (EER) for Men and Women 30 Years of Age[a]

Food and Nutrition Board, Institute of Medicine, National Academies

Height (m [in])	PAL[b]	Weight for BMI[c] of 18.5 kg/m^2 (kg [lb])	Weight for BMI of 24.99 kg/m^2 (kg [lb])	EER, Men[d] (kcal/day)		EER, Women[d] (kcal/day)	
				BMI of 18.5 kg/m^2	BMI of 24.99 kg/m^2	BMI of 18.5 kg/m^2	BMI of 24.99 kg/m^2
1.50 (59)	Sedentary	41.6 (92)	56.2 (124)	1,848	2,080	1,625	1,762
	Low active			2,009	2,267	1,803	1,956
	Active			2,215	2,506	2,025	2,198
	Very active			2,554	2,898	2,291	2,489
1.65 (65)	Sedentary	50.4 (111)	68.0 (150)	2,068	2,349	1,816	1,982
	Low active			2,254	2,566	2,016	2,202
	Active			2,490	2,842	2,267	2,477
	Very active			2,880	3,296	2,567	2,807
1.80 (71)	Sedentary	59.9 (132)	81.0 (178)	2,301	2,635	2,015	2,211
	Low active			2,513	2,884	2,239	2,459
	Active			2,782	3,200	2,519	2,769
	Very active			3,225	3,720	2,855	3,141

[a] For each year below 30, add 7 kcal/day for women and 10 kcal /day for men. For each year above 30, subtract 7 kcal/day for women and 10 kcal/day for men.

[b] PAL = physical activity level.

[c] BMI = body mass index.

[d] Derived from the following regression equations based on doubly labeled water data:

Adult man: EER = 662 – 9.53 × age (y) + PA × (15.91 × wt [kg] + 539.6 × ht [m])

Adult woman: EER = 354 – 6.91 × age (y) + PA × (9.36 × wt [kg] + 726 × ht [m])

Where PA refers to coefficient for PAL

PAL = total energy expenditure ÷ basal energy expenditure

PA= 1.0 ifPAL ≥ 1.0 < 1.4 (sedentary)

PA = 1.12 if PAL ≥ 1.4 < 1.6 (low active)

PA = 1.27 if PAL ≥ 1.6 < 1.9 (active)

PA = 1.45 if PAL ≥ 1.9 < 2.5 (very active)

Dietary Reference Intakes (DRIs): Acceptable Macronutrient Distribution Ranges

Food and Nutrition Board, Institute of Medicine, National Academies

	Range (percent of energy)		
Macronutrient	Children, 1–3 y	Children, 4–18 y	Adults
Fat	30–40	25–35	20–35
n-6 polyunsaturated fatty acids[a] (linoleic acid)	5–10	5–10	5–10
n-3 polyunsaturated fatty acids[a] (α-linolenic acid)	0.6–1.2	0.6–1.2	0.6–1.2
Carbohydrate	45–65	45–65	45–65
Protein	5–20	10–30	10–35

[a] Approximately 10% of the total can come from longer-chain *n*-3 or *n*-6 fatty acids.

SOURCE: *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids* (2002).

Dietary Reference Intakes (DRIs): Recommended Intakes for Individuals, Macronutrients
Food and Nutrition Board, Institute of Medicine, National Academies

Life Stage Group	Water[a] (L/d)	Carbohydrate (g/d)	Total Fiber (g/d)	Fat (g/d)	Linoleic Acid (g/d)	α-Linolenic Acid (g/d)	Protein[b] (g/d)
Infants							
0–6 mo	0.7*	60*	ND	31*	4.4*	0.5*	9.1*
7–12 mo	0.8*	95*	ND	30*	4.6*	0.5*	**11.0**[c]
Children							
1–3 y	1.3*	**130**	19*	ND	7*	0.7*	**13**
4–8 y	1.7*	**130**	25*	ND	10*	0.9*	**19**
Males							
9–13 y	2.4*	**130**	31*	ND	12*	1.2*	**34**
14–18 y	3.3*	**130**	38*	ND	16*	1.6*	**52**
19–30 y	3.7*	**130**	38*	ND	17*	1.6*	**56**
31–50 y	3.7*	**130**	38*	ND	17*	1.6*	**56**
51–70 y	3.7*	**130**	30*	ND	14*	1.6*	**56**
> 70 y	3.7*	**130**	30*	ND	14*	1.6*	**56**
Females							
9–13 y	2.1*	**130**	26*	ND	10*	1.0*	**34**
14–18 y	2.3*	**130**	26*	ND	11*	1.1*	**46**
19–30 y	2.7*	**130**	25*	ND	12*	1.1*	**46**
31–50 y	2.7*	**130**	25*	ND	12*	1.1*	**46**
51–70 y	2.7*	**130**	21*	ND	11*	1.1*	**46**
> 70 y	2.7*	**130**	21*	ND	11*	1.1*	**46**
Pregnancy							
14–18 y	3.0*	**175**	28*	ND	13*	1.4*	**71**
19–30 y	3.0*	**175**	28*	ND	13*	1.4*	**71**
31–50 y	3.0*	**175**	28*	ND	13*	1.4*	**71**
Lactation							
14–18 y	3.8*	**210**	29*	ND	13*	1.3*	**71**
19–30 y	3.8*	**210**	29*	ND	13*	1.3*	**71**
31–50 y	3.8*	**210**	29*	ND	13*	1.3*	**71**

NOTE: This table presents Recommended Dietary Allowances (RDAs) in **bold** type and Adequate Intakes (AIs) in ordinary type followed by an asterisk (*). RDAs and AIs may both be used as goals for individual intake. RDAs are set to meet the needs of almost all (97 to 98 percent) individuals in a group. For healthy infants fed human milk, the AI is the mean intake. The AI for other life stage and gender groups is believed to cover the needs of all individuals in the group, but lack of data or uncertainty in the data prevent being able to specify with confidence the percentage of individuals covered by this intake.

[a] *Total* water includes all water contained in food, beverages, and drinking water.

[b] Based on 0.8 g/kg body weight for the reference body weight.

[c] Change from 13.5 in prepublication copy due to calculation error.

Dietary Reference Intakes (DRIs): Additional Macronutrient Recommendations
Food and Nutrition Board, Institute of Medicine, National Academies

Macronutrient	Recommendation
Dietary cholesterol	As low as possible while consuming a nutritionally adequate diet
Trans fatty acids	As low as possible while consuming a nutritionally adequate diet
Saturated fatty acids	As low as possible while consuming a nutritionally adequate diet
Added sugars	Limit to no more than 25% of total energy

SOURCE: *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids* (2002).

Dietary Reference Intakes (DRIs): Estimated Average Requirements for Groups

Food and Nutrition Board, Institute of Medicine, National Academies

Life Stage Group	CHO (g/d)	Protein (g/d)[a]	Vit A (µg/d)[b]	Vit C (mg/d)	Vit E (mg/d)[c]	Thiamin (mg/d)	Ribo-flavin (mg/d)	Niacin (mg/d)[d]	Vit B_6 (mg/d)	Folate (µg/d)[b]	Vit B_{12} (µg/d)	Copper (µg/d)	Iodine (µg/d)	Iron (mg/d)	Magnes-ium (mg/d)	Molyb-denum (µg/d)	Phos-phorus (mg/d)	Sele-nium (µg/d)	Zinc (mg/d)
Infants																			
7–12 mo		9*												6.9					2.5
Children																			
1–3 y	100	11	210	13	5	0.4	0.4	5	0.4	120	0.7	260	65	3.0	65	13	380	17	2.5
4–8 y	100	15	275	22	6	0.5	0.5	6	0.5	160	1.0	340	65	4.1	110	17	405	23	4.0
Males																			
9–13 y	100	27	445	39	9	0.7	0.8	9	0.8	250	1.5	540	73	5.9	200	26	1,055	35	7.0
14–18 y	100	44	630	63	12	1.0	1.1	12	1.1	330	2.0	685	95	7.7	340	33	1,055	45	8.5
19–30 y	100	46	625	75	12	1.0	1.1	12	1.1	320	2.0	700	95	6	330	34	580	45	9.4
31–50 y	100	46	625	75	12	1.0	1.1	12	1.1	320	2.0	700	95	6	350	34	580	45	9.4
51–70 y	100	46	625	75	12	1.0	1.1	12	1.4	320	2.0	700	95	6	350	34	580	45	9.4
> 70 y	100	46	625	75	12	1.0	1.1	12	1.4	320	2.0	700	95	6	350	34	580	45	9.4
Females																			
9–13 y	100	28	420	39	9	0.7	0.8	9	0.8	250	1.5	540	73	5.7	200	26	1,055	35	7.0
14–18 y	100	38	485	56	12	0.9	0.9	11	1.0	330	2.0	685	95	7.9	300	33	1,055	45	7.3
19–30 y	100	38	500	60	12	0.9	0.9	11	1.1	320	2.0	700	95	8.1	255	34	580	45	6.8
31–50 y	100	38	500	60	12	0.9	0.9	11	1.1	320	2.0	700	95	8.1	265	34	580	45	6.8
51–70 y	100	38	500	60	12	0.9	0.9	11	1.3	320	2.0	700	95	5	265	34	580	45	6.8
> 70 y	100	38	500	60	12	0.9	0.9	11	1.3	320	2.0	700	95	5	265	34	580	45	6.8
Pregnancy																			
14–18 y	135	50	530	66	12	1.2	1.2	14	1.6	520	2.2	785	160	23	335	40	1,055	49	10.5
19–30 y	135	50	550	70	12	1.2	1.2	14	1.6	520	2.2	800	160	22	290	40	580	49	9.5
31–50 y	135	50	550	70	12	1.2	1.2	14	1.6	520	2.2	800	160	22	300	40	580	49	9.5
Lactation																			
14–18 y	160	60	885	96	16	1.2	1.3	13	1.7	450	2.4	985	209	7	300	35	1,055	59	10.9

19–30 y	160	60	900	100	16	1.2	1.3	13	1.7	450	2.4	1,000	209	6.5	255	36	580	59	10.4
31–50 y	160	60	900	100	16	1.2	1.3	13	1.7	450	2.4	1,000	209	6.5	265	36	580	59	10.4

NOTE: This table presents Estimated Average Requirements (EARs), which serve two purposes: for assessing adequacy of population intakes, and as the basis for calculating Recommended Dietary Allowances (RDAs) for individuals for those nutrients. EARs have not been established for vitamin D, vitamin K, pantothenic acid, biotin, choline, calcium, chromium, fluoride, manganese, or other nutrients not yet evaluated via the DRI process.

[a] For individual at reference weight (Table 1-1). *indicates change from prepublication copy due to calculation error.

[b] As retinol activity equivalents (RAEs). 1 RAE = 1 µg retinol, 12 µg β-carotene, 24 µg α-carotene, or 24 µg β-cryptoxanthin. The RAE for dietary provitamin A carotenoids is two-fold greater than retinol equivalents (RE), whereas the RAE for preformed vitamin A is the same as RE.

[c] As α-tocopherol. α-Tocopherol includes *RRR*-α-tocopherol, the only form of α-tocopherol that occurs naturally in foods, and the *2R*-stereoisomeric forms of α-tocopherol (*RRR*-, *RSR*-, *RRS*-, and *RSS*-α-tocopherol) that occur in fortified foods and supplements. It does not include the *2S*-stereoisomeric forms of α-tocopherol (*SRR*-, *SSR*-, *SRS*-, and *SSS*-α-tocopherol), also found in fortified foods and supplements.

[d] As niacin equivalents (NE). 1 mg of niacin = 60 mg of tryptophan.

[e] As dietary folate equivalents (DFE). 1 DFE = 1µg food folate = 0.6 µg of folic acid from fortified food or as a supplement consumed with food = 0.5 µg of a supplement taken on an empty stomach.

SOURCES: *Dietary Reference Intakes for Calcium, Phosphorous, Magnesium, Vitamin D, and Fluoride* (1997); *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B_6, Folate, Vitamin B_{12}, Pantothenic Acid, Biotin, and Choline* (1998); *Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids* (2000); *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc* (2001), and *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids* (2002). These reports may be accessed via www.nap.edu.

THE USE AND EFFECTIVENESS OF BEHAVIOURAL MODIFICATION TECHNIQUES IN ACHIEVING AND MAINTAINING NORMAL WEIGHT AND FITNESS – THE LIFESTYLE CHANGES FOR ADULTS IN CYPRUS

A PROJECT SUBMITTED TO MIDDLESEX UNIVERSITY
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF
PROFESSIONAL STUDIES

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PART III

APRIL, 2011

How to Use the Protocol

The *Protocol and Guidelines for professional users for weight management for Adults: categorization, assessment, therapy of overweight and obesity* was developed by the work-based study of the joint project of the *Doctorate in Professional Studies with the title:*

'The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Lifestyle Changes for Adults in Cyprus".

The goal of the Protocol is to offer practical recommendations for appraising and caring overweight and obese people and to supply with the means needed to successfully handle abnormal weight problems in a professional approach.

The Protocol has been created to assist the health professionals straight forward in order to find all of the information needed.

- The General Guidelines consists of the necessary information in a condensed format.
- The Therapy Guidelines section presents facts on assessment and management of Weight Loss Candidates (WLCs) and the Therapy Algorithm, which offers an analytical method of how to handle obese and overweight people.
- The Appendix consists of practical instruments related to diet, physical activity, and behavioural modification needed to train and provide with the most current information for obese and overweight people.

Managing overweight and obese mandates a diversity of abilities. The importance of the health care team consisting of: physicians, registered dietitians, psychologists, and exercise physiologists should be stressed. Each health care professional can help WLCs learn to make some of the changes needed to be made gradually and in long term.

Steps for managing Overweight and Obesity

1. **Anthropometric measurements** for estimate of BMI, body fat, weight, and height.
2. **Waist circumference**
3. **Assess** complications.
4. **Determine** the need to treat obesity and overweight .
5. **Motivation** of the obese and overweight to manage and maintain the weight.
6. **Choose** appropriate diet plan.
7. **Recommend a physical activity goal** with the WLC using the Guide to Physical Activity.
8. **Evaluate the Weekly Food and Activity Diary** with the WLC.
9. **Provide the WLC with the dietary information,** the Guide to Physical Activity, the Guide to Behaviour Change, and the Weekly Food and Activity Diary.
10. **Identify the WLC's information** and the goals you have agreed on in the Weight and Goal Record.

General Guidelines

Lifestyle changes … An enduring effort.

Treatment of an overweight or obese person incorporates a two-step process: assessment and management. Assessment includes strength of mind of the degree of obesity and overall health status. Management involves not only weight loss and maintenance of body weight but also measures to control other risk factors. Assessment and management includes the ten steps for the management of obesity and overweight mentioned above. Obesity is a chronic disease; WLC and practitioner must understand that successful treatment requires a lifelong effort. Persuasive evidence supports the benefit of weight loss for reducing blood pressure, lowering blood glucose, and improving dyslipidemias.

Nutritional Assessment

A **nutrition** assessment is an in-depth evaluation of both objective and subjective data related to an individual's food and **nutrient** intake, lifestyle, and medical history.

Once the data on an individual is collected and organized, the dietitian can assess and evaluate the nutritional status of that person. The assessment leads to a plan of care, or intervention, designed to help the individual either maintain the assessed status or attain a healthier status.

Key points of the Assessment

The data for a nutritional assessment falls into four categories: **anthropometric**, **biochemical**, **clinical, and dietary.**

Anthropometrics.

Anthropometrics (Williams 1997) are the objective measurements of body muscle and fat. They are used to compare individuals, to compare growth in the young, and to assess weight loss or gain in the mature individual. Weight and height are the most frequently used anthropometric measurements. Also skinfold measurement of several areas of the body is also taken.

As early as 1836, tables had been developed to compare weight and height in order to provide a reference for an individual's health status. The Metropolitan Life Insurance Company revised height and weight tables in 1942, using data from policyholders, to relate weight to disease and mortality. There has been much discussion about the significance and suitability of using the individuals who buy life insurance as a basis for "ideal" height and weight. There are also a number of problems with using a table to determine whether an individual is at the right weight—or even what the "ideal weight" means. Tables should therefore be used only as a guide, and other measurements should be included in the data collection and evaluation.

METROPOLITAN HEIGHT AND WEIGHT TABLES FOR
MEN AND WOMEN ON METRIC BASIS
According to Frame, Ages 25-59
WOMEN
Weight in Kilograms (In Indoor Clothing)*

HEIGHT	**SMALL**	**MEDIUM**	**LARGE**
(In Shoes)+	**FRAME**	**FRAME**	**FRAME**
Centimeters			
148	46.4 - 50.5	49.6 - 55.1	53.7 - 59.8
149	46.6 - 51.0	50.0 - 55.5	54.1 - 60.3
150	46.7 - 51.3	50.3 - 55.9	54.4 - 60.9
151	46.9 - 51.7	50.7 - 56.4	54.6 - 61.4
152	47.1 - 52.1	51.1 - 57.0	55.2 - 61.9
153	47.4 - 52.5	51.5 - 57.5	55.6 - 62.4
154	47.8 - 53.0	51.9 - 58.0	56.2 - 63.0
155	48.1 - 53.6	52.2 - 58.6	56.8 - 63.6
156	48.5 - 54.1	52.7 - 59.1	57.3 - 64.1
157	48.8 - 54.6	53.2 - 59.6	57.8 - 64.6
158	49.3 - 55.2	53.8 - 60.2	58.4 - 65.3
159	49.8 - 55.7	54.3 - 60.7	58.9 - 66.0
160	50.3 - 56.2	54.9 - 61.2	59.4 - 66.7
161	50.8 - 56.7	55.4 - 61.7	59.9 - 67.4
162	51.4 - 57.3	55.9 - 62.3	60.5 - 68.1
163	51.9 - 57.8	56.4 - 62.8	61.0 - 68.8
164	52.5 - 58.4	57.0 - 63.4	61.5 - 69.5
165	53.0 - 58.9	57.5 - 63.9	62.0 - 70.2
166	53.6 - 59.5	58.1 - 64.5	62.6 - 70.9
167	54.1 - 60.0	58.7 - 65.0	63.2 - 71.7

168	54.6 - 60.5	59.2 - 65.5	63.7 - 72.4
169	55.2 - 61.1	59.7 - 66.1	64.3 - 73.1
170	55.7 - 61.6	60.2 - 66.6	64.8 - 73.8
171	56.2 - 62.1	60.7 - 67.1	65.3 - 74.5
172	56.8 - 62.6	61.3 - 67.6	65.8 - 75.2
173	57.3 - 63.2	61.8 - 68.2	66.4 - 75.9
174	57.8 - 63.7	62.3 - 68.7	66.9 - 76.4
175	58.3 - 64.2	62.8 - 69.2	67.4 - 76.9
176	58.9 - 64.8	63.4 - 69.8	68.0 - 77.5
177	59.5 - 65.4	64.0 - 70.4	68.5 - 78.1
178	60.0 - 65.9	64.5 - 70.9	69.0 - 78.6
179	60.5 - 66.4	65.1 - 71.4	69.6 - 79.1
180	61.0 - 66.9	65.6 - 71.9	70.1 - 79.6
181	61.6 - 67.5	66.1 - 72.5	70.7 - 80.2
182	62.1 - 68.0	66.6 - 73.0	71.2 - 80.7
183	62.6 - 68.5	67.1 - 73.5	71.7 - 81.2

MEN

Weight in Kilograms (In Indoor Clothing)*

HEIGHT (In Shoes)+	SMALL FRAME	MEDIUM FRAME	LARGE FRAME
Centimeters			
158	58.3 - 61.0	59.6 - 64.2	62.8 - 68.3
159	58.6 - 61.3	59.9 - 64.5	63.1 - 68.8
160	59.0 - 61.7	60.3 - 64.9	63.5 - 69.4
161	59.3 - 62.0	60.6 - 65.2	63.8 - 69.9
162	59.7 - 62.4	61.0 - 65.6	64.2 - 70.5
163	60.0 - 62.7	61.3 - 66.0	64.5 - 71.1
164	60.4 - 63.1	61.7 - 66.5	64.9 - 71.8
165	60.8 - 63.5	62.1 - 67.0	65.3 - 72.5
166	61.1 - 63.8	62.4 - 67.6	65.6 - 73.2
167	61.5 - 64.2	62.8 - 68.2	66.0 - 74.0
168	61.8 - 64.6	63.2 - 68.7	66.4 - 74.7
169	62.2 - 65.2	63.8 - 69.3	67.0 - 75.4
170	62.5 - 65.7	64.3 - 69.8	67.5 - 76.1
171	62.9 - 66.2	64.8 - 70.3	68.0 - 76.8
172	63.2 - 66.7	65.4 - 70.8	68.5 - 77.5
173	63.6 - 67.3	65.9 - 71.4	69.1 - 78.2
174	63.9 - 67.8	66.4 - 71.9	69.6 - 78.9
175	64.3 - 68.3	66.9 - 72.4	70.1 - 79.6
176	64.7 - 68.9	67.5 - 73.0	70.7 - 80.3
177	65.0 - 69.5	68.1 - 73.5	71.3 - 81.0
178	65.4 - 70.0	68.6 - 74.0	71.8 - 81.8
179	65.7 - 70.5	69.2 - 74.6	72.3 - 82.5

180	66.1 - 71.0	69.7 - 75.1	72.8 - 83.3
181	66.6 - 71.6	70.2 - 75.8	73.4 - 84.0
182	67.1 - 72.1	70.7 - 76.5	73.9 - 84.7
183	67.7 - 72.7	71.3 - 77.2	74.5 - 85.4
184	68.2 - 73.4	71.8 - 77.9	75.2 - 86.1
185	68.7 - 74.1	72.4 - 78.6	75.9 - 86.8
186	69.2 - 74.8	73.0 - 79.3	76.6 - 87.6
187	69.8 - 75.5	73.7 - 80.0	77.3 - 88.5
188	70.3 - 76.2	74.4 - 80.7	78.0 - 89.4
189	70.9 - 76.9	74.9 - 81.5	78.7 - 90.3
190	71.4 - 77.6	75.4 - 82.2	79.4 - 91.2
191	72.1 - 78.4	76.1 - 83.0	80.3 - 92.1
192	72.8 - 79.1	76.8 - 83.9	81.2 - 93.0
193	73.5 - 79.8	77.6 - 84.8	82.1 - 93.9

- Indoor clothing weighing 2.3 kilograms for men and 1.4 kilograms for women.+ Shoes with 2.5 cm heels

Source: Halls Steven 2008

In 1959, research indicated that the lowest mortality rates were associated with below-average weight, and the phrase "desirable weight" replaced "ideal weight" in the title of the height and weight table.

To further characterize an individual's height and weight, tables also include body-frame size, which can be estimated in many ways. An easy way is to wrap the thumb and forefinger of the nondominant hand around the wrist of the dominant hand. If the thumb and forefinger meet, the frame is medium; if the fingers do not meet, the frame is large; and if they overlap, the frame is small.

Determining frame size is an attempt at attributing weight to specific body compartments. Frame size identifies an individual relative to the bone size, but does not differentiate muscle mass from body fat. Because it is the muscle mass that is metabolically active and the body fat that is associated with disease

states, **Body Mass Index** (BMI) is used to estimate the body-fat mass. BMI is derived from an equation using weight and height.

To estimate body fat, skinfold measurement can be made using skin-fold calipers. Most frequently, tricep and subscapular (shoulder blade) skin-folds are measured. Measurements can then be compared to reference data—and to previous measurements of the individual, if available. Accurate measuring takes practice, and comparison measurements are most reliable if done by the same technician each time.

To estimate desirable body weight for amputees and for paraplegics and quadriplegics, equations have been developed from cadaver studies, estimating desirable body weight, as well as **calorie** and **protein** needs. Calorie needs are determined by the height, weight, and age of an individual, which determine an estimate of daily needs.

The **Harris-Benedict equation** (Christie 2000) is frequently used, but there are quicker methods to estimate needs using just height and weight. Opinions and methods vary on how to estimate calorie needs for the **obese**. As previously mentioned body fat is less metabolically active and requires fewer calories for support than muscle mass. If an individual's current body weight is more than 125 percent of the desirable weight for the individual's height and age, then using body weight to estimate calories needs usually leads to an over-estimation of those needs.

Biochemical data

Laboratory tests based on blood and urine can be important indicators of nutritional status, but they are influenced by nonnutritional factors as well. Lab results can be altered by medications, **hydration** status, and disease states or other **metabolic** processes (Winkler 1993), such as **stress**. As with the other areas of nutrition assessment, biochemical data need to be viewed as a part of the whole.

Clinical data

Clinical data provides information about the individual's medical history, including **acute** and **chronic** illness and diagnostic procedures, therapies, or treatments that may increase nutrient needs or induce **malabsorption**. Current medications need to be documented, and both prescription **drugs** and **over-the-counter** drugs, such as laxatives or analgesics, must be included in the analysis. **Vitamins**, **minerals**, and

herbal preparations also need to be reviewed. Physical signs of **malnutrition** can be documented during the nutrition interview and are an important part of the assessment process.

Dietary data

There are many ways to document dietary intake. The accuracy of the data is frequently challenged, however, since both questioning and observing can impact the actual intake. During a nutrition interview the practitioner may ask what the individual ate during the previous twenty-four hours, beginning with the last item eaten prior to the interview. Dietitians can train individuals (Grant1999) on completing a food diary, and they can request that the record be kept for either three days or one week Documentation should include portion sizes and how the food was prepared. Brand names or the restaurant where the food was eaten can assist in assessing the details of the intake. Estimating portion sizes is difficult, and requesting that every food be measured or weighed is time-consuming and can be impractical. Food models and photographs of foods are therefore used to assist in recalling the portion size of the food. In a metabolic study, where accuracy in the quantity of what was eaten is imperative, the researcher may ask the individual to prepare double portions of everything that is eaten—one portion to be eaten, one portion to be saved (under refrigeration, if needed) so the researcher can weigh or measure the quantity and document the method of preparation.

Food frequency questionnaires are used to gather information on how often a specific food or category of food is eaten. The Food Guide Pyramid suggests portion sizes and the number of servings from each food group to be consumed on a daily basis, and can also be used as a reference to evaluate dietary intake.

During the nutrition interview, data collection will include questions about the individual's lifestyle—including the number of meals eaten daily, where they are eaten, and who prepared the meals. Information about allergies, food intolerances, and food avoidances, as well as caffeine and alcohol use, should be collected. Exercise frequency and occupation help to identify the need for increased calories. Asking about the economics of the individual or family, and about the use and type of kitchen equipment, can assist in the development of a plan of care. Dental and oral health also impacts the nutritional assessment, as well as information about gastrointestinal health, such as problems with constipation, gas or diarrhea, vomiting, or frequent heartburn.

Evaluation

After data are collected, the practitioner uses past experience as well as reference standards to assimilate the information into an assessment that provides an understanding of the individual's nutritional status. The practitioner uses the anthropometric data to assess ideal and desirable weight, as well as skinfold measurement to determine body fat. Height, weight, and age are plugged into the Harris-Benedict equation to determine calorie and protein needs. Using the clinical, biochemical, and dietary data, influences on the nutritional status can be determined. A nutritional intervention, which usually includes dietary guidance and exercise recommendations, is then formulated and discussed with the individual.

More Analytical ….

Anthropometrics

Anthropometrics are the objective measurements of body muscle and fat. They are used to compare individuals, to compare growth in the young, and to assess weight loss or gain in the mature individual. Weight and height are the most frequently used anthropometric measurements, and skinfold measurement of several areas of the body is also taken.

Body Mass Index

Assessment of a WLC should include the evaluation of body mass index (BMI), body fat, weight, height and waist circumference, and overall medical risk. To estimate BMI, divide the individual's weight (in in kilos) by, the height (in meters) squared. This approximates BMI in kilograms per meter squared (kg/m^2). There is evidence to support the use of BMI in risk assessment since it provides a more accurate measure of total body fat compared with the assessment of body weight alone. Clinical judgment must be employed when evaluating very muscular WLCs because BMI may overestimate the degree of fatness in these WLCs. The recommended categorization s for BMI, adopted by the Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults and endorsed by leading organizations of health professionals, are shown in Table 1.

Table 1

Classifications for BMI	
	BMI
Underweight	<18.5 kg/m^2
Normal weight	18.5–24.9 kg/m^2
Overweight	25–29.9 kg/m^2
Obesity (Class 1)	30–34.9 kg/m^2
Obesity (Class 2)	35–39.9 kg/m^2
Extreme obesity (Class 3)	≥40 kg/m^2

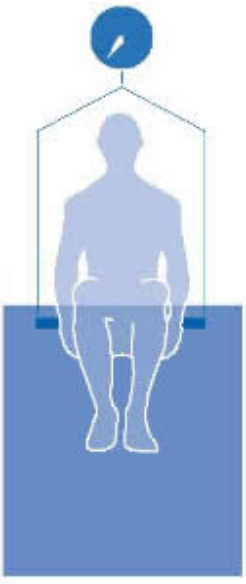
Source: WHO 1997, WHO 2000

Body Fat

Measuring Body Fat - Evaluating Methods for Various Measurements

Most people now understand that to have a healthier body means to have a leaner body. These people are ready for Body Composition Analysis (BCA) (Gallagher et al 2000). The following section will explain you with the most popular methods of BCA used in gyms, homes, and professional practices.

Hydrodensitometry Weighing (Underwater Weighing) - This method measures whole body density by determining body volume (Gallagher et al 2000). There is a variety of equipment available to do underwater weighing ranging in sophistication from the standard stainless steel tank with a chair or cot mounted on underwater scales, to a chair and scale suspended from a diving board over a pool or hot tub.



This technique first requires weighing a person outside the tank, then immersing them totally in water and weighing them again. The densities of bone and muscles are higher than water, and fat is less dense than water. So a person with more bone and muscle will weight more in water than a person with less bone and muscle, meaning they have a higher body density and lower percentage of body fat. The volume of the body is calculated and the individual's body density is determined by using standard formulas.

Then body fat percentage is calculated from body density using standard equations (either *Siri* or *Brozek*).

The underlying assumption with this method is that densities of fat mass and fat-free mass are constant. However, underwater weighing may not be the appropriate gold standard for everyone. For example, athletes tend to have denser bones and muscles than non-athletes, which may lead to an underestimation of body fat percentage. While the body fat of elderly WLCs suffering from osteoporosis may be overestimated. To date, specific equations have not been developed to accommodate these different population groups.

An important consideration in this method is the amount of air left in a person's lungs after breathing out. This residual lung volume can be estimated or measured, but it is established that a direct measure is desirable and it should be taken in the tank whenever possible. Another consideration is that the water in the tank must be completely still; there can be no wind or movement.

Although this method has long been considered the laboratory "gold standard", many people find it difficult, cumbersome, and uncomfortable, and others are afraid of total submersion or cannot expel all the air in their lungs. Clinical studies often require subjects to be measured three to five times and an average taken of the results.

Calipers (Anthropometry- Skinfold Measurements) - Using hand-held calipers that exert a standard pressure, the skinfold thickness is measured at various body locations (3-7 test sites are common). Then a calculation is used to derive a body fat percentage based on the sum of the measurements. Different prediction equations are needed for children and specific ethnic groups (over 3,500 equations have been validated). This approach usually uses underwater weighing as a reference method. The caliper method is based upon the assumption that the thickness of the subcutaneous fat (found just under the skin) reflects a constant proportion of the total body fat (contained in the body cavities), and that the sites selected for measurement represent the average thickness of the subcutaneous fat.

Skinfold measurementis made by grasping the skin and underlying tissue, shaking it to exclude any muscle and pinching it between the jaws of the caliper. Duplicate readings are often made at each site to improve the accuracy and reproducibility of the measurements. Often to save time in large population studies, a single skinfold site measurement is made to reduce the time involved. Such a test should be used only for a rough estimate of obesity.

Generally speaking, skinfold measurement is easy to do, inexpensive and the method is portable. Overall, results can be very subjective as precision ultimately depends on the skill of the technician and the site measured. The quality of the calipers is also a factor; they should be accurately calibrated and have a constant specified pressure. Inexpensive models sold for home use are usually less accurate than those used by an accredited caliper technician. The more obese the subject, the more difficult to "pinch" the skinfold correctly, requiring even more skill to obtain an accurate measurement (Gallagher et al 2000).

DEXA (Dual Energy X-ray Absorptiometry) - A relatively new technology that is very accurate and precise, DEXA is based on a three-compartment model that divides the body into total body mineral, fat-free soft (lean) mass, and fat tissue mass. This technique is based on the assumption that bone mineral content is directly proportional to the amount of photon energy absorbed by the bone being studied.

DEXA uses a whole body scanner that has two low doses x-rays at different sources that read bone and soft tissue mass simultaneously. The sources are mounted beneath a table with a detector overhead. The scanner passes across a person's reclining body with data collected at 0.5 cm intervals. A scan takes between 10-20 minutes. It is safe and noninvasive with little burden to the individual, although a person must lie still throughout the procedure.

DEXA is fast becoming the new "gold standard" because it provides a higher degree of precision in only one measurement and has the ability to show exactly where fat is distributed throughout the body. It is very reliable and its results extremely repeatable; in addition, the method is safe and presents little burden to the

subject. Although this method is not as accurate in measuring the extremely obese and the cost of equipment is high, DEXA is quickly moving from the laboratory setting into clinical studies (Gallagher et al 2000).

NIR (Near Infrared Interactance) - A fiber optic probe is connected to a digital analyzer that indirectly measures the tissue composition (fat and water) at various sites on the body. This method is based on studies that show optical densities are linearly related to subcutaneous and total body fat. The biceps is the most often used single site for estimating body fat using the NIR method. The NIR light penetrates the tissues and is reflected off the bone back to the detector. The NIR data is entered into a prediction equation with the person's height, weight, frame size, and level of activity to estimate the percent body fat.

This method has become popular outside of the laboratory because it is simple, fast, noninvasive, and the equipment is relatively inexpensive. However, the amount of pressure applied to the fiber optic probe during measurement may affect the values of optical densities, and skin color and hydration level may be potential sources of error. To date, studies conducted with this method have produced mixed results; a high degree of error has occurred with very lean and very obese people; and the validity of a single-site measurement at the biceps is questionable. Numerous sources report that more research is needed to substantiate the validity, accuracy and applicability of this method (Gallagher et al 2000).

Magnetic Resonance Imaging (MRI) - An x-ray based method in which a magnetic field "excites" water and fat molecules in the body, producing a measurable signal. A person lies within the magnet as a computer scans the body. High-quality images show the amount of fat and where it is distributed. MRI takes about 30 minutes and is very safe as it uses no ionizing radiation, but use is limited due to the high cost of equipment and analysis (Gallagher et al 2000).

Total Body Electrical Conductivity (TOBEC) - This method is based on lean tissue being a better conductor of electricity than fat. A person lies in a cylinder that generates a very weak electromagnetic field. The strength of the field depends on the electrolytes found in the person's body water. In about 10 seconds, TOBEC makes 10 conductivity readings that estimate lean body mass. Although very accurate, its use is limited due to the high cost of the equipment (Gallagher et al 2000).

Computed Tomography (CT) - CT produces cross-sectional scans of the body. An x-ray tube sends a beam of photons toward a detector. As the beam rotates around a person, data is collected, stored, and applied to complex algorithms to build images that determine body composition. CT is particularly useful in giving a ratio of intra-abdominal fat to extra-abdominal fat. It is noninvasive, but potential is limited by exposure to radiation and high equipment cost (Gallagher et al 2000).

BOD POD (Air Displacement) - Based on the same principle as underwater weighing, the BOD POD used computerized sensors to measure how much air is displaced while a person sits for 20 seconds in a capsule. It uses a calculation to determine body density, and then estimated body fat. The equipment is very expensive and limited in availability (Gallagher et al 2000).

BIA (Bioelectrical Impedance) - The only method that is based on measuring something, not estimating anything, is Bio-Impedance measurement. Bio-Impedance is a means of measuring electrical signals as they pass through the fat, lean mass, and water in the body. Through laboratory research we know the actual impedance or conductivity of various tissues in the body, and we know that by measuring current between two electrodes and applying this information to complex proven scientific formulas accurate body composition can be determined. The fact that the measurement is based on a reading of lean mass and not an estimate of fat mass, lends to a much more comprehensive testing method and results (Gallagher et al 2000).

Body Fat Measuring

Know where you stand with your weight

The average person grows up thinking about their weight, without taking into account their body fat percentage. Realizing your weight alone doesn't distinguish whether the pounds come from fat or muscle. In order to assess your physical fitness level, you need to regularly monitor your body fat. Reducing body fat and building muscle is associated with numerous benefits such as greater strength, reduced likelihood of injury, and higher metabolism.

As it was presented above, there are several ways to determine your body fat percent available today. Gaining wide support by medical and fitness experts is the bioelectrical impedance analysis (BIA). From the

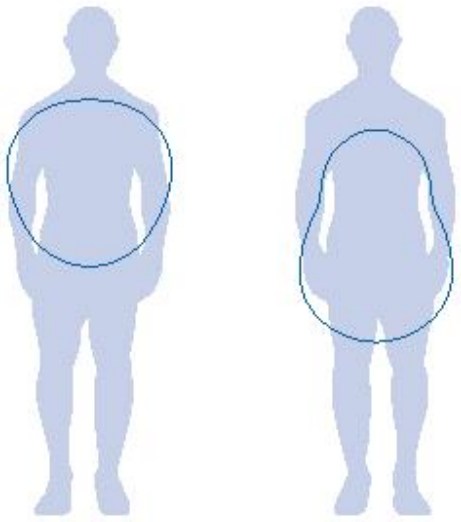
privacy of your home, this method offers the easiest and most convenient method by integrating advanced technology and traditional BIA into a bathroom scale.

Height-Weight Tables were originally developed by insurance companies to establish recommended weight ranges for men and women. The "desirable" weights were those associated with the lowest mortality among large population studies of insured people. Unfortunately, these studies do not accurately represent a cross-section of the entire American population.

Waist Measurement

Waist size is an additional, independent risk factor and can be used in conjunction with any other method. It reflects growing evidence that excess visceral fat - surrounding the abdominal organs - on its own increases the chance of heart disease or diabetes.

Research indicates that visceral fat (waist size) is more important in the disease process than subcutaneous fat which is just under the skin ("love handles," "pinchable inches"). Abdominal fat cells appear to produce certain compounds that may influence cholesterol and glucose metabolism. In men, a waist size of >40" and in women >35" is an indication of increased health risk.



Android or "apple-shaped" obese people are more vulnerable to disease than those who are gynoid or "pear-shaped."

Waist Circumference

Excess abdominal fat is an important, independent risk factor for disease. The evaluation of waist circumference to assess the risks associated with obesity or overweight is supported by research. The measurement of waist-to-hip ratio provides no advantage over waist circumference alone. Waist circumference measurement is particularly useful in WLCs who are categorized as normal or overweight. It is not necessary to measure waist circumference in individuals with BMIs $\geq$ 35 kg/m^2 since it adds little to the predictive power of the disease risk categorization of BMI. Men who have waist circumferences greater

than 40 inches (102cm), and women who have waist circumferences greater than 35 inches (88cm), are at higher risk of diabetes, dyslipidemia, hypertension, and cardiovascular disease because of excess abdominal fat. Individuals with waist circumferences greater than these values should be considered one risk category above that defined by their BMI.

The higher the BMI, the greater is the risk of developing additional health problems. A BMI of 30 and over increases the risk of death from any cause by 50 to 150 percent, according to some estimates. According to health experts, people who are overweight but have no other health risk factors (such as high cholesterol or high blood pressure) should eat healthier and exercise to keep from gaining additional weight. For people who are overweight and also have health risks, they recommend trying to actively lose weight. Be sure to consult your doctor or other health professional before beginning any exercise or weight-loss program.
The NHLBI obesity guidelines propose that doctors use body mass index (BMI) to assess WLCs because the index is simple, correlates to fatness and applies to both men and women. To determine BMI, weight in kilograms is divided by height in meters, squared.
In June 1998, the federal government announced guide-lines which create a new definition of a healthy weight - a BMI of 24 or less. So now a BMI of 25 to 29.9 is considered overweight. Those with BMI's of 18.5 or less are considered under-weight. A BMI of 30 or over is considered obese.
Both Body Mass Index (BMI) and Waist Circumference (WC) can be useful measures of determining obesity and increased risk for various diseases. According to the National Institutes of Health, a high WC is associated with an increased risk for type 2 diabetes, dyslipidemia, hypertension and cardiovascular disease when BMI is between 25 and 34.9. (A BMI greater than 25 is considered overweight and a BMI greater than 30 is considered obese.) WC can be useful for those people categorized as normal or overweight in terms of BMI. (For example, an athlete with increased muscle mass may have a BMI greater than 25 - making him or her overweight on the BMI scale - but a WC measurement would most likely indicate that he or she is, in fact, not overweight).

Changes in WC over time can indicated an increase or decrease in abdominal fat. Increased abdominal fat is associated with an increased risk of heart disease.

To determine your WC measurement, locate the upper hip bone and place a measuring tape around the abdomen (ensuring that the tape measure is horizontal). The tape measure should be slightly but should not

cause compressions on the skin. The relationship between BMI and waist circumference for defining risk is shown in Table 2.

Table 2

Categorization of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risks				
-			Disease Risk * Relative to Normal Weight and Waist Circumference	
-	BMI (kg/m2)	Obesity Class	Men 102 cm (40 inches or less)	Men › 102 cm (40 inches)
			Women 88 cm (35 inches or less)	Women › 88 cm (35 inches)
Underweight	‹ 18.5	-	-	-
Normal	18.5 - 24.9	-	-	-
Overweight	25.0 - 29.9	-	Increased	High
Obesity	30.0 - 34.9	I	High	Very High
-	35.0 - 39.9	II	Very High	Very High
Extreme Obesity	40.0 +	III	Extremely High	Extremely High

* Disease risk for type 2 diabetes, hypertension, and CVD.

+ Increased waist circumference can also be a marker for increased risk even in persons of normal weight.

Source: WHO 1997

Bioelectrical Impedance

Body impedance is measured when a small, safe electrical signal is passed through the body, carried by water and fluids. Impedance is greatest in fat tissue, which contains only 10-20% water, while fat-free mass, which contains 70-75% water, allows the signal to pass much more easily. By using the impedance measurements along with a person's height and weight, and body type (gender, age, fitness level), it is possible to calculate the percentage of body fat, fat-free mass, hydration level, and other body composition values. Conventional BIA normally uses underwater weighing as its method of reference.

Using BIA to estimate person's body fat assumes that the body is within normal hydration ranges. When a person is dehydrated, the amount of fat tissue can be overestimated. Factors that can affect hydration include not drinking enough fluids, drinking too much caffeine or alcohol, exercising or eating just before measuring, certain prescription drugs or diuretics, illness, or a woman's menstrual cycle. Measuring under consistent conditions (proper hydration and same time of day) will yield best results with this method.

Because BIA can be affected by body hydration, many professionals may use this method as a means of tracking the hydration status of their WLCs. This is especially important for athletes who are training or performing, as well as for the chronically ill.

In the traditional BIA method, a person lies on a cot and spot electrodes are placed on the hands bare feet. Electrolyte gel is applied first, and then a current of 50 kHz is introduced. BIA has emerged as a promising technique because of its simplicity, low cost, high reproducibility and noninvasiveness. BIA prediction equations can be either generalized or population-specific, allowing this method to be potentially very accurate. Selecting the appropriate equation is important to determining the quality of the results. To minimize variables caused by a person's hydration level, measurements should always be taken under constant and controlled conditions.

For clinical purposes, scientists are developing a multi-frequency BIA method that may further improve the method's ability to predict a person's hydration level. New segmental BIA equipment that uses more electrodes may lead to more precise measurements of specific parts of the body.

Tanita has developed a simplified version of BIA that uses leg-to-leg bioimpedance analysis. In this system, two footpad electrodes (pressure contact) are incorporated into the platform of a precision electronic scale. A person's measurements are taken while in a standing position with the electrodes in contact with bare feet. The body fat monitor/analyzer automatically measures weight and then impedance. Computer software (a microprocessor) imbedded in the product uses the measured impedance, the subject's gender, height, fitness level, and in some cases age, (which have been preprogrammed), and the weight to determine body fat percentage based on equation formulas. Tanita's reference method is DEXA. Through multiple regression analysis, Tanita has derived standard formulas to determine body fat percentage. Tanita's equations are generalized for standard adults, athletes, and children.

The Tanita method has all the advantages of traditional BIA as well as greater ease of use, speed, and portability. Professional versions of the products can be found in hospitals, health clubs, and research labs and include computer printouts of comprehensive data such as BMI, fat percent, fat weight, total body water, fat-free mass, and BMR. The concept has been adapted for use as an affordable home monitoring device. Now ordinary people along with fitness enthusiasts and WLCs with health risks can measure body fat as part of a regular healthy lifestyle. The same variables apply with regard to hydration levels, and measuring should be done under consistent conditions.

The "rating system" for assessing the current level of body fat for malw and female are provided in table 3.

Table 3

Table 3a-MALE					
Age	**EXCELLENT(%) 1**	**VERY GOOD(%) 2**	**GOOD(%) 3**	**FAIR9%) 4**	**POOR (%) 5**
19-24	< 11	11.1 - 15	15.1 - 19	19.1 - 23	> 23
25-29	< 13	13.1 - 17	17.1 - 20	20.1 - 24	> 24
30-34	< 15	15.1 - 18	18.1 - 22	22.1 - 25	> 25
35-39	< 16	16.1 - 19	19.1 - 23	23.1 - 26	> 26
40-44	< 18	18.1 - 21	21.1 - 24	24.1 - 27	> 27
45-49	< 19	19.1 - 22	22.1 - 25	25.1 - 28	> 28
50-54	< 20	22.1 - 23	23.1 - 26	26.1 - 29	> 29
55 +	< 20	20.1 -24	24.1 -27	27.1 - 30	> 30

Table 3b-FEMALE					
Age	**EXCELLENT(%) 1**	**VERY GOOD(%) 2**	**GOOD(%) 3**	**FAIR(5) 4**	**POOR(5) 5**
19-24	< 19	19.1 - 22	22.1 -25	25.1 - 30	> 30
25-29	< 19	19.1 - 22	22.1 - 25	25.1 -30	> 30
30-34	< 20	20.1 - 23	23.1 - 26	26.1 - 31	> 31
35-39	< 21	21.1 - 24	24.1 - 28	28.1 - 32	> 32
40-44	< 23	23.1 - 26	26.1 - 29	29.1 - 33	> 33
45-49	< 24	24.1 - 27	27.1 - 31	31.1 - 34	> 34
50-54	< 27	27.1 - 31	31.1 - 34	34.1 - 37	> 37
55 +	< 28	28.1 - 31	31.1 -34	34.1 -38	> 38

Table 3c-Description	**Women**	**Men**
Essential fat	10-13%	1-3%
Athletes	14–20%	6-13%
Fitness	21–24%	14–17%
Average	25–31%	18–24%
Obese	32%+	25%+

Source: International Journal of Obesity 2002

Risk Factors

Overall risk must take into account the potential presence of other risk factors. Some diseases or risk factors associated with obesity place WLCs at a high absolute risk for subsequent mortality; these will require aggressive management. Other conditions associated with obesity are less lethal but still require treatment.

Those diseases or conditions that denote high absolute risk are established coronary heart disease, other atherosclerotic diseases, type 2 diabetes, and sleep apnea. Osteoarthritis, gallstones, stress incontinence, and gynecological abnormalities such as amenorrhea and menorrhagia increase risk but are not generally life-threatening**.** Three or more of the following risk factors also confer high absolute risk: hypertension, cigarette smoking, high low-density lipoprotein cholesterol, low high-density lipoprotein cholesterol, impaired fasting glucose, family history of early cardiovascular disease, and age (male ≥ 45 years, female ≥ 55 years).

More on Risk Factors of Obesity

According to CDC (2010) the risk of premature death rises with increasing weight. Even moderate weight gain (5-10 kilos for a person of average height) increases the risk of death, particularly among adults aged 30 to 64 years. Individuals who are obese (BMI greater than 30) have a 50 to 100 percent increased risk of premature death from all causes, compared to individuals with a healthy weight. Following there is a brief description of all the risk factors of obesity based on CDC (2010).

Increased Health Risk of Heart Disease

The risk of heart attack, congestive heart failure, sudden cardiac death, and angina or chest pain is increased in persons who are overweight or obese. High blood pressure is twice as common in adults who are obese than in those who are at a healthy weight. Obesity is associated with high triglycerides and decreased HDL cholesterol.

Increased Health Risk of Stroke

Atherosclerosis, or narrowing of the arteries, which may lead to the formation of an arterial blood clot, is an important pre-condition of many strokes. Atherosclerosis is accelerated by high blood pressure, smoking, high cholesterol and lack of exercise. Obesity, especially morbid obesity is frequently associated with a

high-fat diet, raised blood pressure and lack of exercise. Thus obesity is now considered an important secondary risk factor for strokes.

Increased High Blood Pressure

This may then also lead to:

- Headaches
- Ear noise & buzzing
- Tiredness
- Shortness of breath
- Excessive sweating
- Confusion
- Vision changes
- Nose bleeds
- Blood in urine
- Kidney damage / failure
- Strokes

Increased Health Risk of Type 2 Diabetes

A weight increase of 5-8 kilos increases a person's risk of developing type 2 diabetes to twice that of individuals who have not gained weight. Over 80 percent of people with diabetes are overweight or obese.

Increased Health Risk of Cancers

Obesity is associated with an increased risk for some types of cancer including endometrial (cancer of the lining of the uterus), colon, gall bladder, prostate, kidney, and post-menopausal breast cancer. Women gaining more than 9 kilos from age 18 to midlife double their risk of post-menopausal breast cancer, compared to women whose weight remains stable.

Increased risk of Erectile Dysfunction

This stressful disorder is often linked to Insulin Resistance, an imbalance in blood glucose and insulin levels associated with excess weight and obesity. Being overweight can place extra strain on the cardiovascular system and disrupt the delicate balance required to achieve an erection and, therefore, cause ED.

Increased Health Risk of Fatty Liver Disease

The main cause of non alcoholic fatty liver disease is insulin resistance, a metabolic disorder in which cells become insensitive to the effect of insulin. One of the most common risk factors for insulin resistance is obesity, especially central abdominal obesity. Studies indicate a correlation between body mass index (BMI) and the degree of liver damage. The higher the BMI the worse can be the liver disease.

Obesity is a Risk Factor for Chronic Venous Insufficiency

Although obesity is not a direct cause of chronic venous insufficiency, it is an important risk factor. This is because obesity, especially morbid obesity, leads to raised blood pressure, a sedentary lifestyle and musculoskeletal problems (hampering mobility and use of leg muscles), all of which are contributory factors in the development of chronic venous insufficiency. Obese WLCs also have an increased health risk of other vascular disorders (e.g. lower-limb ischemia), caused by inadequate blood flow to the extremities.

Increased Health Risk of Gallbladder Disease

The risk of gallstones is approximately 3 times greater for obese WLCs than in non-obese people. Indeed, the risk of symptomatic gallstones appears to correlate with a rise in body mass index (BMI).

Increased Health Risk of Breathing Problems

Obstructive sleep apnea (that is, interrupted breathing during sleeping) is more common in obese persons. Obesity is associated with a higher prevalence of asthma and severe bronchitis, as well as obesity hypoventilation syndrome and respiratory insufficiency.

Obesity and Deep Vein Thrombosis

Risk factors for deep vein thrombosis include prior history of the disease, vascular damage, hypertension and predisposition to blood clotting. Although obesity (BMI 30+) has traditionally been recognized as a risk factor for deep vein thrombosis and pulmonary embolism, experts now consider that the evidence supporting this association is inadequate, as much depends on other factors such as history, illness, immobility, and age.

Increased Health Risk of Arthritis

Musculoskeletal disorders, including osteoarthritis, are much more prevalent among obese WLCs, especially WLCs diagnosed with severe clinical or morbid obesity. Health studies show that obesity is a strong predictor for symptoms of osteoarthritis, especially in the knees. The risk of osteoarthritis increases with every 1-kilo gain in weight.

Increased Health Risks for Expectant Mother and Baby

Obesity has a strong detrimental effect on the health of both mother and new-born baby, both during and after pregnancy. Obesity while pregnant is associated with a higher risk of death in both the baby and the mother. It also raises the risk of high blood pressure in the Mom, by 10 times. Obesity during pregnancy is also associated with an increased risk of birth defects, such as spina bifida. Obesity-related health problems occurring after childbirth include higher risk of wound and endometrial infection, endometritis and urinary tract infection.

Psychological and Social Effects of Obesity

Emotional suffering may be one of the most painful parts of obesity. American society emphasizes physical appearance and often equates attractiveness with slimness, especially for women. Such messages make overweight people feel unattractive.

Other Risks:
- Elevated serum cholesterol levels
- Elevated LDL (”bad” cholesterol) levels
- Decreased HDL (”good” cholesterol) levels
- Elevated triglyceride levels
- Decreased blood oxygen
- Decreased testosterone levels
- Irregular menstrual cycles
- Incontinence
- Increased surgical risks
- Tinnitus
- Reduced immune function
- Swollen joints / fluid retention
- Muscular aches and pains, particularly:

Neck
Shoulders
Chest
- Biomechanical injuries & faults, including:

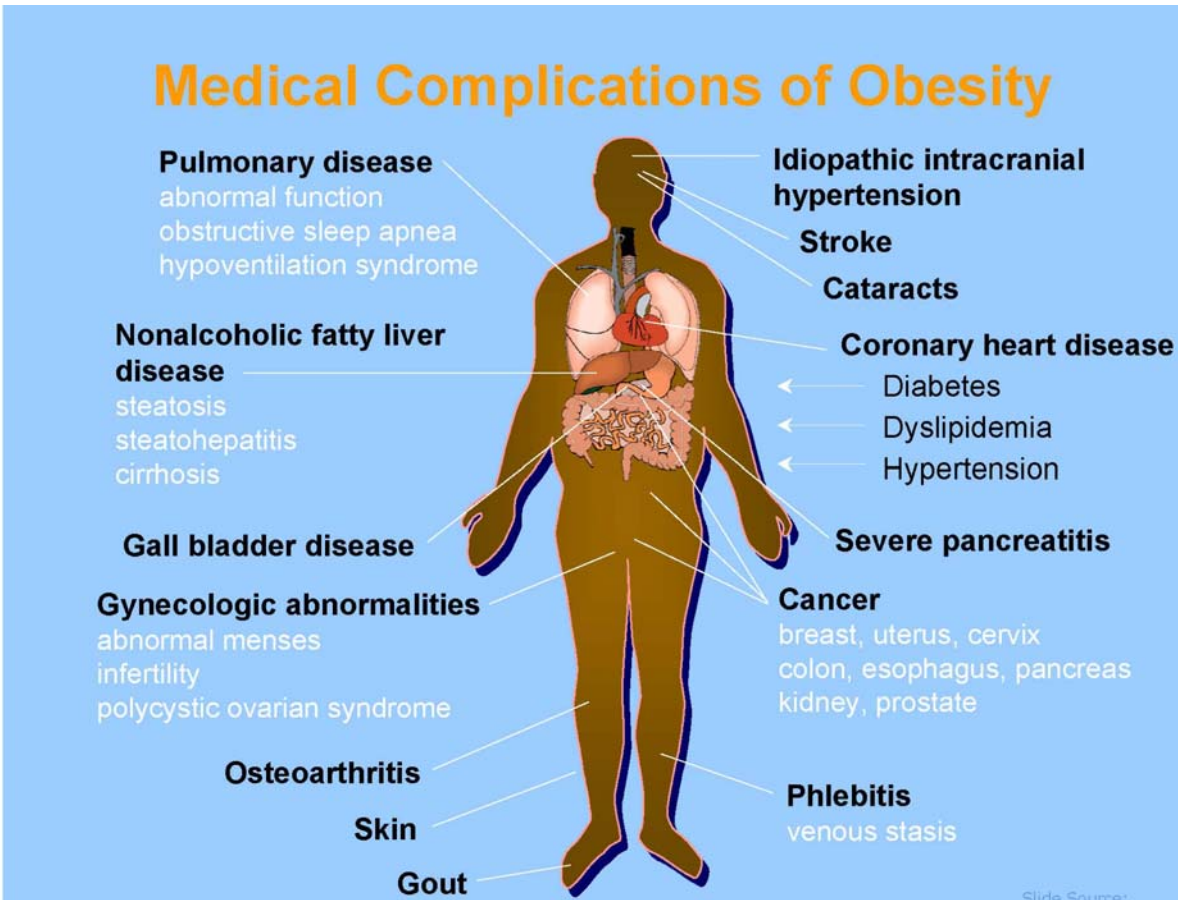
Sunken arches / flat foot
Heel spurs
Plantar fasciitis
Shin soreness
Creaking knees
Achilles tendonitis
Calcific tendonopathy
Sprained ankles
Bone chips
- Impotence
- INFERTILITY
- Loss of libido

Health Improvements after Weight Reduction

The good news is that losing a small amount of weight can reduce your chances of developing heart disease or a stroke. Reducing your weight by 10 percent can decrease your chance of developing heart disease by improving how your heart works, blood pressure, and levels of blood cholesterol and triglycerides. Studies show that you can improve your health by losing as little as 5-10 kilos.

Read pragmatic recommendations about the topic of lose weight fast – make sure to read this site. The times have come when concise info is really at your fingertips, use this chance.

Figure 1



Willingness to Lose Weight

The decision to attempt weight-loss treatment should also consider the WLC's readiness to make the necessary lifestyle changes. Evaluation of readiness should include the following:

- Reasons and incentive for weight loss
- Prior attempts at weight loss
- Support anticipated from family and friends
- considerate of risks and benefits
- Attitudes toward physical activity
- Time accessibility
- Possible barriers, including economic limits, to the WLC's acceptance of change

Management

Weight Loss

Individuals at lesser risk should be counseled about effective lifestyle changes to prevent any further weight gain. Goals of therapy are to reduce body weight and maintain a lower body weight for the long term; the prevention of further weight gain is the minimum goal. An initial weight loss of 10 percent of body weight achieved over 6 months is a recommended target. The rate of weight loss should be ½ to 1 kg each week. Greater rates of weight loss do not achieve better long-term results. After the first 6 months of weight loss therapy, the priority should be weight maintenance achieved through combined changes in diet, physical activity, and behaviour. Further weight loss can be considered after a period of weight maintenance.

Weight loss therapy is recommended for WLCs
With a BMI ≥30 and for WLCs with a BMI between 25 and 29.9 OR a high-risk waist circumference, and two or more risk factors.

Prevention better than therapy: Prevention of Weight Gain

In some WLCs, weight loss or a reduction in body fat is not achievable. A goal for these WLCs should be the prevention of further weight gain. Prevention of weight gain is also an appropriate goal for people with a BMI of 25 to 29.9 who are not otherwise at high risk.

Therapies

A combination of diet modification, increased physical activity, and behaviour therapy can be effective.

Dietary Therapy

Caloric intake should be reduced by 500 to 1,000 calories per day (kcal/day) from the current level.

Most overweight and obese people should adopt long-term nutritional adjustments to reduce caloric intake. Dietary therapy includes instructions for modifying diets to achieve this goal. Moderate caloric reduction is the goal for the majority of cases; however, diets with greater caloric deficits are used during active weight loss. The diet should be low in calories, but it should not be too low (less than 800 kcal/day). Diets lower than 800 kcal/day have been found to be no more effective than low-calorie diets in producing weight loss. They should not be used routinely, especially not by providers untrained in their use. In general, diets containing 1,000 to 1,200 kcal/day should be selected for most women; a diet between 1,200 kcal/day and 1,600 kcal/day should be chosen for men and may be appropriate for women who weigh 75 kg or more, or who exercise. Long-term changes in food choices are more likely to be successful when the WLC's preferences are taken into account and when the WLC is educated about food composition, labeling, preparation, and portion size. Although dietary fat is a rich source of calories, reducing dietary fat without reducing calories will not produce weight loss. Frequent contact with dietitians during the period of diet adjustment is likely to improve compliance. Reduction of 500-1000kcal/day will lead to a recommended weight loss of 0.5-1 kg/ week

Physical Activity

Physical activity has direct and indirect benefits.

Increased physical activity is important in efforts to lose weight because it increases energy expenditure and plays an integral role in weight maintenance. Physical activity also reduces the risk of heart disease more than that achieved by weight loss alone. In addition, increased physical activity may help reduce body fat and prevent the decrease in muscle mass often found during weight loss. For the obese WLC, activity should generally be increased slowly, with care taken to avoid injury. A wide variety of activities and/or household chores, including walking, dancing, gardening, and team or individual sports, may help satisfy this goal. All adults should set a long-term goal to accumulate at least 30 minutes or more of moderate-intensity physical activity on most, and preferably all, days of the week.

Behaviour Therapy

Including behavioural therapy helps with fulfillment of the body weight goal.

Behaviour therapy is a useful adjunct to planned adjustments in food intake and physical activity. Specific behavioural strategies include the following: self-monitoring, stress management, stimulus control, problem-solving, contingency management, cognitive restructuring, and social support (see below table 4 and adapted table to the research in appendix N). Behavioural therapies may be employed to promote adoption of diet and activity adjustments; these will be useful for a combined approach to therapy. Strong evidence supports the recommendation that weight loss and weight maintenance programs should employ a combination of low-calorie diets, increased physical activity, and behaviour therapy.

Table 4

Behavioural Therapy
1. Getting Started
2. Self-Monitoring
3. Modifying Diet
4. Increasing Physical Activity
5. Stimulus Control
6. Changing the Act of Eating
7. Problem Solving
8. Social Support
9. Restaurant Eating
10. Changing Cognitions
11. Managing Stress
12. Motivational
13. Relapse Prevention

Source: Wadden & Foster 1992

Lifestyle changes that may be helpful: Many doctors give overweight WLCs a pill, a pep talk, and a pamphlet about diet and exercise, but that combination leads only to minor weight loss (Wadden et al., 2002). When overweight people attend group sessions aimed at changing eating and exercise patterns, keep daily records of food intake, and exercise and eat a specific low-calorie diet, the outcome is much more successful. Group sessions where participants are given information and help on how to make lifestyle changes, appear to improve the chances of losing weight and keeping it off. Such changes may include shopping from a list, storing foods out of sight, keeping portion sizes under control, and avoiding fast-food restaurants.

Exercise has been found to enhance the effectiveness of low-calorie diets (Racette et al., 1995). In addition, studies have shown that exercise alone (without dietary restriction) can promote weight loss in obese people. On the other hand, a review of numerous studies found that the typical regimen of three to five hours per week of exercise generally had little effect on weight loss, and may, in the case of resistance exercise, even increase weight slightly (Votruba et al., 2000). Exercise appears to have a more consistent ability to enhance loss of fat tissue, specifically, as well as to preserve non-fat tissue in the body (particularly resistance training, such as weight-lifting). Preliminary research suggests that the most significant contribution by exercise may be in helping to maintain weight loss following a diet (Votruba et al., 2000).

People who experience 'weight cycling" (*repetitive* weight loss and gain) have a tendency toward binge eating (periods of compulsive overeating, but without the self-induced vomiting seen in bulimia), according to a review of numerous studies focusing on weight loss (National Task Force, 2000) The researchers also found an association between weight cycling and depression or poor body image. The most successful weight-loss programmes (in which weight stays off, mood stays even, and no binge eating occurs), appear to use a combination of moderate caloric restriction, moderate exercise, and behaviour modification, including examination and adjustment of eating habits.

Reflecting to my joint project, the main components of the checklist to be used are: self-monitoring, stimulus control, contingency management, changing behaviour parameters, and cognitive behaviour modification. Table 5 illustrates the components and a description of the behaviour treatment components

Table 5

Behaviour Treatment Component

Component	Description	Examples
Self-monitoring	Recording of target behaviors and factors associated with behaviors	Food and exercise records, moods and environment associated with overeating
Stimulus control	Restricting environmental factors associated with inappropriate behaviors	Keep away from high-fat foods; eat at specific times and places; set aside time and place for exercise
Contingency management	Rewarding appropriate behaviors	Give prizes for achieving exercise goals
Changing behavior parameters	Directly altering target behavior topology	Slow down eating; self-regulate exercise
Cognitive-behavior modification	Changing thinking patterns related to target behaviors	Counter social pressure to be thin to reduce temptation to diet

Source: Foreyt and Goodrick 2004

Weight Loss Surgery

Surgery is an option for WLCs with extreme obesity.

Weight loss surgery provides medically significant sustained weight loss for more than 5 years in most WLCs. Although there are risks associated with surgery, it is not yet known whether these risks are greater in the long term than those of any other form of treatment. Surgery is an option for well-informed and motivated WLCs who have clinically severe obesity (BMI ≥ 40) or a BMI ≥ 35 and serious comorbid conditions. (The term 'clinically severe obesity" is preferred to the once commonly used term 'morbid obesity.") Surgical WLCs should be monitored for complications and lifestyle adjustments throughout their lives.

Clinically severe obesity
(BMI ≥40) or a BMI≥35 and serious comorbid conditions may warrant surgery for weight loss.

Introduction

Obesity is a complex, multifactorial disease that develops from the interaction between genotype and the environment. Our under standing of how and why obesity occurs is incomplete; however, it involves the integration of social, behavioural, cultural, physiological, metabolic, and genetic factors (NRC 1989)

Today, health care dietitians are encouraged to play a greater role in the management of obesity. Many physicians/dietitians are seeking guidance in effective methods of treatment. This guide provides the basic tools needed to assess and manage overweight and obesity in an office setting. A physician who is familiar with the basic elements of these services can more successfully fulfill the critical role of helping the WLC improve health by identifying the problem and coordinating other resources within the community to assist the WLC.

Effective management of overweight and obesity can be delivered by a variety of health care professionals with diverse skills working as a team. For example, physician involvement is needed for the initial assessment of risk and the prescription of appropriate treatment programs that may include pharmacotherapy, surgery, and the medical management of the comorbidities of obesity. In addition, physicians can and should engage the assistance of other professionals. This guide provides the basic tools needed to assess and manage overweight and obesity for a variety of health professionals, including nutritionists, registered dietitians, exercise physiologists, nurses, and psychologists. These professionals offer expertise in dietary counseling, physical activity, and behaviour changes and can be used for assessment, treatment, and follow-up during weight loss and weight maintenance. The relationship between the practitioner and these professionals can be a direct, formal one (as a ‘team”), or it may be based on an indirect referral. A positive, supportive attitude and encouragement from all professionals are crucial to the continuing success of the WLC.

The Problem of Overweight and Obesity

The results with regard to the epidemiological study of obesity in Cyprus contacted by the Cyprus Dietetic and Nutrition Association (Andreou et al 2005-2009) are presented in Table 6. It is important to emphasize that a significant percentage of the population appears to have a body weight problem (63.9% overweight or obese); whereas the breakdown to gender reveals that the Cypriot male population has a more acute problem

than the female population. Roughly three quarters of Cypriot males are overweight or obese, whereas only one in two Cypriot women fall into this category.

Table 6

Percentage of Overweight and Obesity in the Cypriot Population

Class	BMI (kg/m^2)	% Men	% Women	% Total
Underweight	<20	2.1	10.5	6.4
Normal	20-25	22.2	36.6	29.6
Overweight	25-30	46.9	26.0	36.1
Obese	>30	28.8	26.9	27.8
Overweight + Obese	>25	75.7	52.9	63.9
Mean BMI (kg/m^2)		28.14	26.67	27.38
Standard Deviation		4.36	6.09	5.37

Source: Andreou et al 2009

These conditions substantially increase the risk of morbidity from hypertension (Dyer 1989), dyslipidemia (Tehernof1996), type 2 diabetes (Lew et al 1979) (Larssonet al 1981) (Ford et al 1997) (Lipton et al 1993), coronary artery disease (Hubert et al 1983)stroke (Rexrode et al 1997), gallbladder disease (Stampfer et al 1992), osteoarthritis Hochberget al 1995), and sleep apnea and respiratory problems (Young et al 1993) as well as cancers of the endometrium, breast, prostate, and colon (Chute et al 1991). Higher body weights are also associated with an increase in mortality from all causes (Lew et al 1979). Obese individuals may also suffer from social stigmatization and discrimination.

However, overweight and obesity are not mutually exclusive, since obese persons are also overweight. A BMI of 30 indicates an individual is about 13.6 kg overweight; it may be exemplified by a 100 kg person who is 180 cm tall or an 84.5 kg individual who is 167 cm tall.

Therapy Guidelines

Although there is agreement about the health risks of overweight and obesity, there is less agreement about their management. Some have argued against treating obesity because of the difficulty in maintaining long-term weight loss, and because of the potentially negative consequences of weight cycling, a pattern frequently seen in obese individuals. Others argue that the potential hazards of treatment do not outweigh the known hazards of being obese. The therapy guidelines provided are based on the most thorough examination of the scientific evidence reported to date on the effectiveness of various treatment strategies available for weight loss and weight maintenance.

Therapy of the overweight and obese WLC is a two-step process: assessment and management.

- **Assessment** requires determination of the degree of obesity and the absolute risk status.

- **Management** includes the reduction of excess weight and maintenance of this lower body weight, as well as the institution of additional measures to control any associated risk factors.

The aim of this guide is to provide useful advice on how to achieve weight reduction and how to maintain a lower body weight. Obesity is a chronic disease; the WLC and the practitioner need to understand that successful therapy requires a lifelong effort

Adapt therapy to the Needs of the WLC

Standard treatment approaches for overweight and obesity must be modified to the needs of various WLCs or WLC groups. Great individual difference exists within any social or cultural group; in addition, extensive overlap occurs among subcultures within the larger society. There is, consequently, no ‘recipe book” or uniform set of rules to optimize weight reduction with a given category of WLC. Though, obesity treatment programs that are ethnically susceptible and integrate a WLC’s distinctiveness must do the following:

- Adjust the setting and staffing for the program.
- Recognize how the obesity treatment program integrates into other aspects of the WLC’s health care and self-care.
- Anticipate and allow modifications to a program based on a WLC’s reply and preferences.

Assessment and Categorazization of Overweight and Obesity

Although accurate methods to assess body fat exist, the measurement of body fat by these techniques is expensive and is often not readily available to most clinicians. Two replacement measures are important to assess body fat:

- Body mass index (BMI)
- Waist circumference

BMI is recommended as a practical approach for assessing body fat in the clinical setting. It provides a more accurate measure of total body fat compared with the assessment of body weight alone.
The typical body weight tables are based on mortality outcomes, and they do not necessarily predict morbidity. However, BMI has some limitations. For example, BMI overestimates body fat in persons who are very muscular, and it can underestimate body fat in persons who have lost muscle mass (e.g., many elderly). BMI is a direct calculation based on height and weight, regardless of gender.

Waist circumference is the most practical tool a clinician can use to evaluate a WLC's abdominal fat before and during weight loss treatment (Figure 3). Computed tomography and magnetic resonance imaging are both more accurate but are impractical for routine clinical use. Fat located in the abdominal region is associated with a greater health risk than peripheral fat (i.e., fat in the gluteal – femoral region). Furthermore, abdominal fat appears to be an independent risk predictor when BMI is not markedly increased. Therefore, waist or abdominal circumference and BMI should be measured not only for the initial assessment of obesity but also for monitoring the efficacy of the weight loss treatment for WLCs with a BMI <35.

The primary categorization of overweight and obesity is based on the assessment of BMI. This categorization, shown in Table 2, relates BMI to the risk of disease. It should be noted that the relationship between BMI and disease risk varies among individuals and among different populations. Some individuals with mild obesity may have multiple risk factors; others with more severe obesity may have fewer risk factors.

Disease Risks

A high waist circumference is associated with an increased risk for type 2 diabetes, dyslipidemia, hypertensions and CVD in WLCs with a BMI between 25 and 34.9kg/m2.

BMI can be calculated as follows

$$BMI = \frac{\text{weight (kg)}}{\text{height (m)}^2}$$

Nomogram

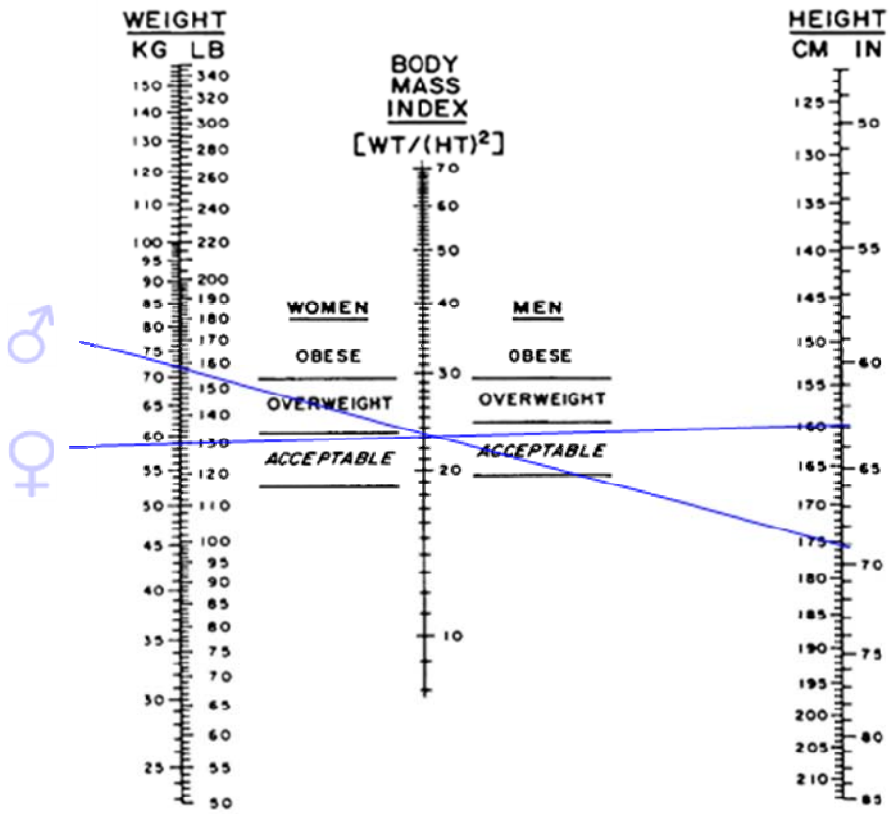
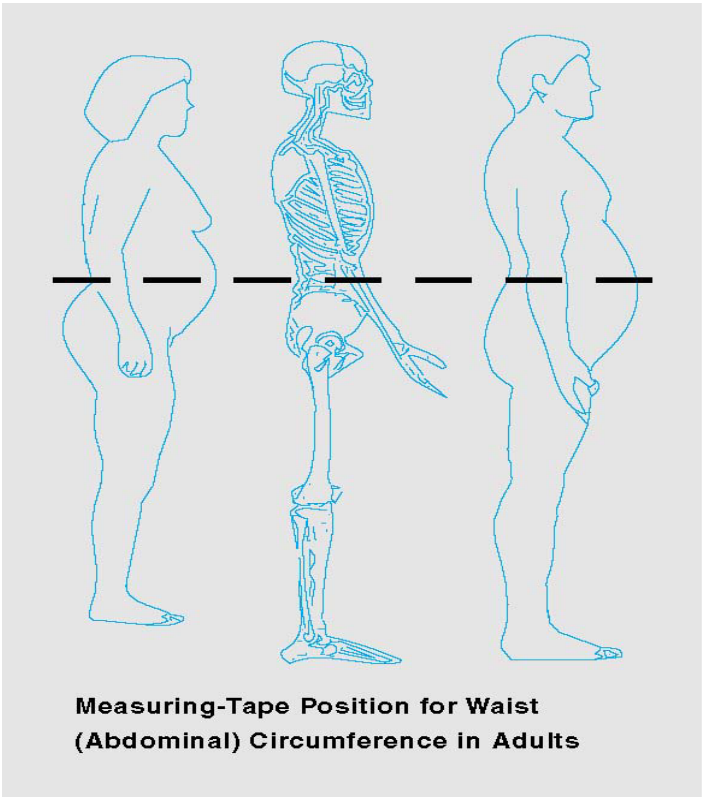


Figure 2

High-Risk Waist Circumference

Men:	> 40 in (> 102 cm)
Women:	> 35 in (> 88 cm)



Measuring-Tape Position for Waist (Abdominal) Circumference in Adults

To measure waist circumference, place the upper hip bone and the top of the right iliac crest. Place a measuring tape in a horizontal plane around and abdomen at the level of the iliac crest. Prior to reading the tape measure, ensure that the tape is snug, but does not compress the skin, and is parallel to the floor. The measurement is made at the end of a normal expiration.

It should be noted that the risk levels for disease depicted in Table 2 are relative risks; in other words, they are relative to the risk at normal body weight. There are no randomized, controlled trials that support a specific categorization system to establish the degree of disease risk for WLCs during weight loss or weight maintenance.

Although waist circumference and BMI are interrelated, waist circumference provides an independent prediction of risk over and above that of BMI. The waist circumference measurement is particularly useful in WLCs who are categorized as normal or overweight in terms of BMI. For individuals with a BMI $\geq$ 35, waist circumference adds little to the predictive power of the disease risk categorization of BMI. A high waist circumference is associated with an increased risk for type 2 diabetes, dyslipidemia, hypertension, and CVD in WLCs with a BMI between 25 and 34.9 kg/m.

In addition to measuring BMI, monitoring changes in waist circumference over time may be helpful; it can provide an estimate of increases or decreases in abdominal fat, even in the absence of changes in BMI. Furthermore, in obese WLCs with metabolic complications, changes in waist circumference are useful predictors of changes in cardiovascular disease (CVD) risk factors. Men are at increased relative risk if they have a waist circumference greater than 102 cm; women are at an increased relative risk if they have a waist circumference greater than 88 cm.

There are ethnic and age-related differences in body fat distribution that modify the predictive validity of waist circumference as a surrogate for abdominal fat (Gallagher et al 1996). In some populations (e.g., Asian Americans or persons of Asian descent), waist circumference is a better indicator of relative disease risk than BMI (Fujimoto et al 1991). For older individuals, waist circumference assumes greater value for estimating risk of obesity-related diseases. Table 2 incorporates both BMI and waist circumference in the categorization of overweight and obesity and provides an indication of relative disease risk.

Explanation of BMI in specific situations

There are situations that may affect its precision. Examples of these are:

- the presence of edema,
- high muscularity,
- muscle wasting, and
- Individuals with low height.

The relationship between BMI and body fat content varies somewhat with age, gender, and possibly ethnicity because of differences in the composition of lean tissue, sitting height, and hydration state. For instance, older people often have lost muscle mass; thus, they have more fat for a given BMI than younger people. Female may have more body fat for a given BMI than male, whereas WLCs with clinical oedema may have less fat for a given BMI compared with those without edema. However, these conditions do not clearly affect the validity of BMI for categorizing people into overweight and obesity in order to watch the weight status of individuals in clinical settings.

Appraisal of Risk Condition

Appraisal of the WLC's risk condition includes the following:

- the level of overweight or obesity based on BMI,
- the abdominal obesity using waist circumference, and
- the presence of associated Cardiovascular Disease risk factors or related diseases.

Determination of the obesity risk factors are required to identify the greatness of a clinical intervention

1. Establish the relative risk status based on overweight and obesity parameters. Table 2 defines relative risk categories according to BMI and waist circumference. They relate to the need to institute weight loss therapy, but they do not define the required intensity of risk factor modification. The latter is determined by the estimation of absolute risk based on the presence of associated disease or risk factors.

2. Recognize WLCs at very high absolute risk. WLCs with the following diseases have a very high absolute risk that triggers the need for intense risk-factor modification and management of the diseases present:

- *recognized coronary heart disease (CHD),* including a history of myocardial infarction, angina pectoris (stable or unstable), coronary artery surgery, or coronary artery procedures (e.g., angioplasty).
- *Presence of other atherosclerotic diseases,* including peripheral arterial disease, abdominal aortic aneurysm, or symptomatic carotid artery disease.
- *Type 2 diabetes (fasting plasma glucose ≥ 126 mg/dL or 2-h postprandial plasma glucose ≥ 200 mg/dL)* is a major risk factor for CVD. Its presence alone places a WLC in the category of very high absolute risk.
- *Sleep apnea.* Symptoms and signs include very loud snoring or cessation of breathing during sleep, which is often followed by a loud clearing breath, then brief awakening.

3. Identify other obesity-associated diseases. Obese WLCs are at increased risk for several conditions that require revealing and suitable management but that usually do not guide to extensive or life-threatening

consequences. These comprise gynecological abnormalities (e.g., menorrhagia, amenorrhea), osteoarthritis, gallstones and their complications, and stress incontinence. Even though obese WLCs are at increased risk for gallstones, the risk of this disease increases throughout periods of fast weight decrease.

Risk Factors		
• Cigarette smoking. • Hypertension (systolic blood pressure of ≥140mm Hg or diastolic blood pressure ≥90 mm Hg) or current use of antihypertensive agents. • High-risk low-density lipoprotein (LDL) cholesterol (serum concentration ≥160 mg/dL). A borderline high-risk LDL-cholesterol (130 to 159 mg/dL) plus two or more other risk factors also confers high risk.	• Low high-density lipoprotein (HDL) cholesterol (serum concentration <35 mg/dL). • Impaired fasting glucose (IFG) (fasting plasma glucose between 110 and 125 mg/dL). IFG is considered by many authorities to be an independent risk factor for cardiovascular (macrovascular) disease, thus justifying its incusion among risk factors contributing to high absolute risk. IFG is well established as a risk factor for type 2 diabetes.	• Family history of premature CHD (myocardial infarction or sudden death experienced by the father or other male first-degree relative at or before 55 years of age, or experienced by the mother or other female first-degree relative at or before 65 years of age). • Age ≥45 years for men or age ≥55 years for women (or postmenopausal)

Source: National Institutes of Health 2000

4. **Recognize cardiovascular risk factors that impart a high absolute risk.** WLCs can be classified as being at high absolute risk for obesity-related disorders if they have three or more of the numerous risk factors listed in the chart above. The existence of high absolute risk increases the awareness paid to cholesterol-lowering therapy and blood pressure management

Other risk factors deserve special consideration since their attendance heightens the need for weight decrease in obese persons.

Physical inactivity imparts an increased risk for both CVD and type 2 diabetes (CDC 1997). Physical inactivity exacerbates the severity of other risk factors, but it also has been shown to be an self-governing risk factor for all-cause death or CVD mortality (Leon et al 1997) (Paffenbarger et al 1993).even though physical inactivity is not listed as a risk factor that modifies the strength of therapy required for high cholesterol or blood pressure, increased physical activity is indicated for management of these conditions] (National Cholesterol Education Program 1994) of the National Cholesterol Education Program and the Sixth Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure) (JNC VI 1994). bigger physical activity is particularly needed in obese WLCs since it promotes weight drop as well as weight maintenance, and satisfactorily modifies obesity-associated risk factors on the contrary, the incidence of physical inactivity in an obese person warrants intensified efforts to remove excess body weight because physical inactivity and obesity both intensify disease risks.

- *Obesity is commonly accompanied by high serum triglycerides.* Triglyceride-rich lipoproteins may be straight atherogenic, and they are also the most ordinary demonstration of the atherogenic lipoprotein phenotype (high triglycerides, small LDL particles, and low HDL-cholesterol levels) (NIH Consensus Conference 1993)
- In the presence of obesity, high serum triglycerides are commonly associated with a clustering of metabolic risk factors known as the metabolic syndrome (atherogenic lipoprotein phenotype, hypertension, insulin resistance, glucose intolerance, and prothrombotic states). Therefore, in obese WLCs, elevated serum triglycerides are an indicator for amplified cardiovascular risk.

Risk Factor Handling

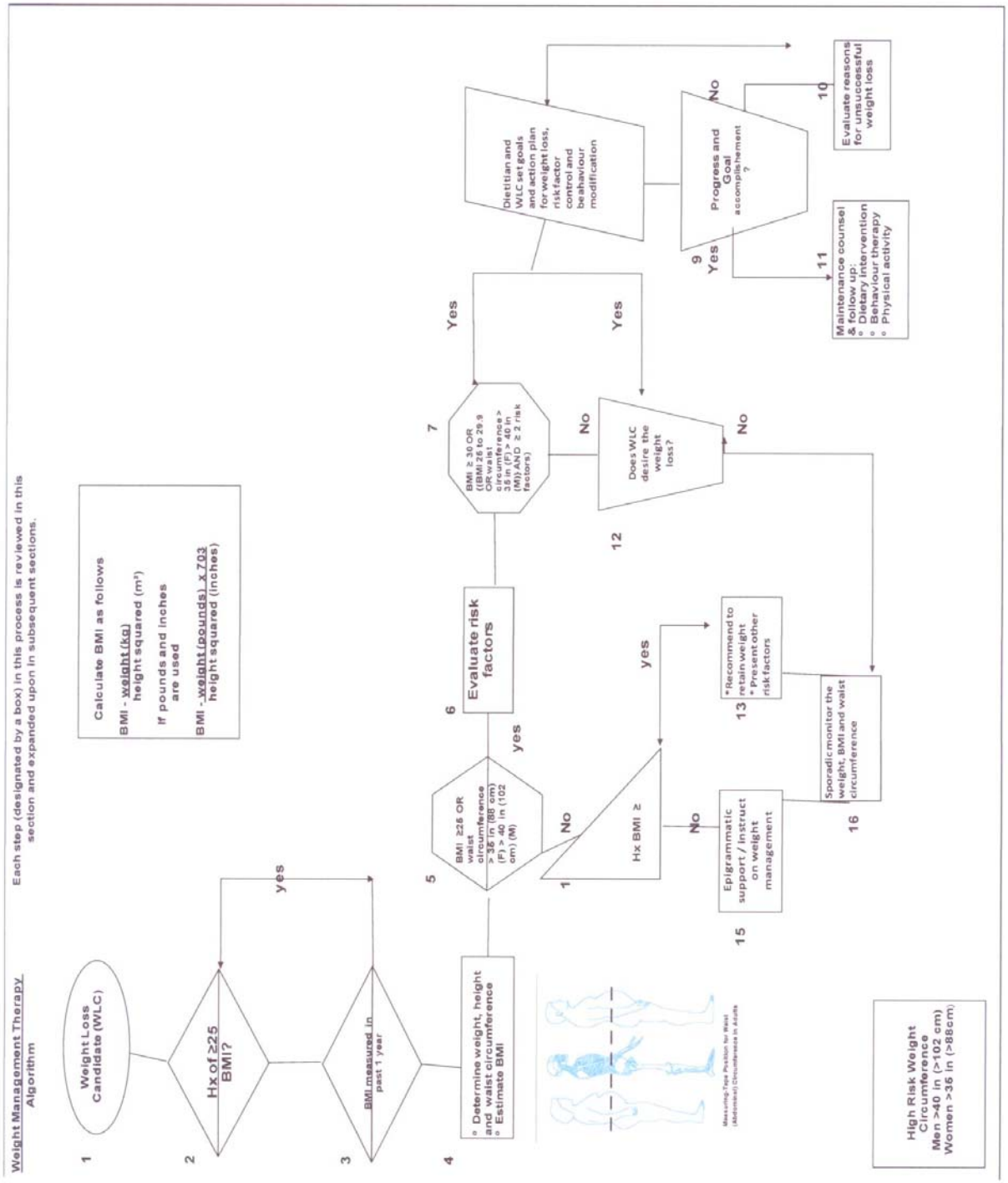
Management options of risk features for preventing CVD, diabetes, and other chronic diseases are described in detail in other reports. For details on the management of serum cholesterol and other lipoprotein disorders, refer to the National Cholesterol Education Program's Second Report of the Expert Panel on the Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel II, ATP II) (NCEP 1994). For the treatment of hypertension, see the National High Blood Pressure Education Program's Sixth Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI 1997).

Evaluation and Action plan

When health care dietitians meet WLCs in the clinical setting, opportunities exist for identifying overweight and obesity and their supplementary risk factors, as well as for initiating treatments for reducing weight, risk factors, and chronic diseases such as CVD and type 2 diabetes. When assessing a WLC for treatment of overweight and obesity, consider the WLC's weight, waist circumference, and presence of risk factors. The strategy for the evaluation and treatment of overweight WLCs is presented in Figure 3 (Treatment Algorithm). This algorithm applies only to the assessment for overweight and obesity; it does not reflect the overall evaluation of other conditions and diseases performed by the clinician. Therapeutic approaches for cholesterol disorders and hypertension are described in ATP II and JNC VI, respectively (NCEP 1994) (JNC VI 1997).In overweight WLCs, control of cardiovascular risk factors deserves the same emphasis as weight loss therapy. Reduction of risk factors will reduce the risk for CVD, whether or not weight loss efforts are successful.

Figure 3.

Therapy Algorithm



Source: National Institutes of Health 2000

Each step (designated by a box) in the treatment algorithm is reviewed in this section and expanded upon in subsequent sections. Each step was adapted to the proposed study.

1. **Weight Loss Canditate (WLC)**

   Any interaction between a health care practitioner (generally a physician, dietitian, nurse practitioner, or physician's assistant) and a WLC that provides the opportunity to assess a WLC's weight status and provide advice, counseling, or treatment.

2. **History of overweight or recorded BMI ≥ 25**

   Seek to determine whether the WLC has ever been overweight. A simple question such as 'Have you ever been overweight?" may accomplish this goal. Questions directed toward weight history, dietary habits, physical activities, and medications may provide useful information about the origins of obesity in particular WLCs.

3. **BMI measured in past 1 year**

   For those who have not been overweight, a 2-year interval is appropriate for the reassessment of BMI. Although this time span is not evidence-based, it is a reasonable compromise between the need to identify weight gain at an early stage and the need to limit the time, effort, and cost of repeated measurements.

4. **Determine weight, height, and waist circumference; estimate BMI** Weight must be measured so BMI can be calculated. Most charts are based on weights obtained with the WLC wearing undergarments and no shoes.

5. **BMI ≥ 25 OR waist circumference > 35 in (88 cm for women) or > 40 in (102 cm for men)** These cutoff values divide overweight from normal weight and are consistent with other national and international guidelines. The relationship between weight and mortality is J-shaped, and evidence suggests that the right side of the 'J" begins to rise at a BMI of 25. Waist circumference is incorporated as an 'or" factor because some WLCs with a BMI lower than 25 will have a disproportionate amount of abdominal fat, which increases their cardiovascular risk despite their low BMI. These abdominal circumference values are not necessary for WLCs with a BMI ≥ 35 kg/m2.

6. **Evaluate risk factors** Risk assessment for CVD and diabetes in a person with evident obesity will include special considerations for the medical history, physical examination, and laboratory examination. Detection of existing CVD or end-organ damage presents the greatest urgency. Because the major risk of obesity is indirect (obesity elicits or aggravates hypertension, dyslipidemias, and type 2 diabetes; each of these leads to cardiovascular complications), the management of obesity should be implemented in the context of these other risk factors. Although there is no direct evidence that addressing risk factors increases weight loss, treating the risk factors through weight loss is a recommended strategy. A nutrition assessment will also help to assess the diet and physical activity habits of overweight WLCs.

7. **BMI ≥ 30 OR ([BMI 25 to 29.9 OR waist circumference > 35 in (88 cm) (women) or > 40 in (102 cm) (men)] AND ≥ 2 risk factors)**

   The panel recommends that all WLCs who meet these criteria should attempt to lose weight. However, it is important to ask the WLC whether or not he or she wants to lose weight. Those with a BMI between 25 and 29.9 kg/m^2 and who have one or no risk factors should work on maintaining their current weight rather than embark on a weight reduction program. The panel recognizes that the decision to lose weight must be made in the context of other risk factors (e.g., quitting smoking is more important than losing weight) and WLC preferences.

8. **Dietitian and WLC set goals.** The decision to lose weight must be made jointly between the clinician and WLC. WLC involvement and investment is crucial to success. The WLC may choose as a goal not to lose weight but rather to prevent further weight gain. As an initial goal for weight loss, the panel recommends the loss of 10 percent of baseline weight at a rate of ½ to 1 kg per week and the establishment of an energy deficit of 500 to 1,000 kcal/ day. For individuals who are overweight, a deficit of 300 to 500 kcal/day may be more appropriate, providing a weight loss of about ¼ to ½ kg per week. Also, for the current study there is evidence that an average of 11.96 percent of body weight can be lost over 18 weeks. Since this observed average weight loss includes people who do not lose weight, an individual goal of 11.97 percent is reasonable. After 36 weeks, most WLCs will equilibrate (caloric intake balancing energy expenditure); thus, they will require an adjustment of their energy balance if they are to lose more weight.

The three major components of weight loss therapy are dietary therapy, increased physical activity, and behaviour therapy. These lifestyle therapies should be attempted for at least 36 weeks before considering any other therapy. In addition, pharmacotherapy should be considered as an adjunct to lifestyle therapy for WLCs with a BMI 30 kg/m^2 and who have no concomitant obesity-related risk factors or diseases. The risk factors or diseases considered important enough to warrant pharmacotherapy at a BMI of 27 to 29.9 kg/m^2 are hypertension, dyslipidemia, CHD, type 2diabetes, and sleep apnea.

Two drugs approved for weight loss by the FDA for long-term use are sibutramine and orlistat. However, sibutramine should not be used in WLCs with a history of hypertension, CHD, congestive heart failure, arrhythmias, or stroke. Certain WLCs may be candidates for weight loss surgery.
Each component of weight loss therapy should be introduced to the WLC briefly. The selection of weight loss methods should be made in the context of WLC preferences, analysis of failed attempts, and consideration of available resources.

9. **Progress and goal accolmlishement.** During the acute weight loss period and at the 18 weeks and 18 weeks follow up/maintenance visits, WLCs should be weighed, their BMI should be calculated, and their progress should be assessed. If at any time it appears that the program is failing, a reassessment should take place to determine the reasons. At the proposed the programme, the average duration of behavioural treatment was proven to be 36 weeks in total which this included 18 weeks weight loss with behaviour modification and 18 weeks for maintenance and behaviour modification. Average weight loss is to be 11.96 kg for weight loss period with an average of weight loss of 0.66kg per week. Overweight and moderately obese WLC could expect to lose 13.96% of their body weight and this is considered a good progress. The WLC can then enter the phase of weight maintenance and long-term monitoring. It is important for the practitioner to recognize that some persons are more apt to lose or gain weight on a given regimen; this phenomenon cannot always be attributed to the degree of compliance. However, if significant obesity persists and the obesity-associated risk factors remain, an effort should be made to reinstitute weight loss therapy to achieve further weight reduction. Once the limit of weight loss has been reached, the practitioner is responsible for long-term monitoring of risk factors and for encouraging the WLC to maintain the level of weight reduction.
10. **Evaluate reasons for unsuccessful weight loss.** If a WLC fails to achieve the recommended 10-

percent reduction in body weight within 6 months or 1 year, a reevaluation is required. A critical question to consider is whether the WLC's level of motivation is high enough to continue clinical therapy. If motivation is high, revise goals and strategies. If motivation is not high, clinical therapy should be discontinued, but the WLC should be encouraged to embark on efforts to lose weight or to avoid further weight gain. Even if weight loss therapy is stopped, risk factor management must be continued. Failure to achieve weight loss should prompt the practitioner to investigate the following: (1) energy intake (i.e., dietary recall including alcohol intake and daily intake logs),

(2) Energy expenditure (physical activity diary), (3) attendance at psychological/behavioural counseling sessions, (4) recent negative life events, (5) family and societal pressures, and (6) evidence of detrimental psychiatric problems (e.g., depression, binge eating disorder). If attempts to lose weight have failed, and the BMI is ≥ 40, or 35 to 39.9 with comorbidities or significant reduction in quality of life, surgical therapy should be considered.

11. **Maintenance counsel and follow up.** Evidence suggests that more than 80 percent of the individuals who lose weight will gradually regain it. WLCs who continue to use weight maintenance programs have a greater chance of keeping weight off. Maintenance includes continued contact with the health care practitioner for education, support, and medical supervision.

12. **Determine the desire of the WLC to lose weight.** WLCs who do not want to lose weight but who are overweight (BMI 25 to 29.9), without a high waist circumference and with one or no cardiovascular risk factors, should be counseled regarding the need to maintain their weight at or below its present level. WLCs who wish to lose weight should be guided according to. The justification of offering these overweight WLCs the option of maintaining (rather than losing) weight is that their health risk, although higher than that of persons with a BMI < 25, is only moderately increased.

13. **Recommend to retain weight/present other risk factors.** WLCs who have a history of overweight and who are now at an appropriate body weight, and those WLCs who are overweight but not obese and who wish to focus on maintenance of their current weight, should be provided with counseling and advice so their weight does not increase. An increase in weight increases their health risk and should be prevented. The clinician should actively promote prevention strategies, including enhanced attention to

diet, physical activity, and behaviour therapy. For addressing other risk factors; even if weight loss cannot be addressed, other risk factors should be treated.

14. **History of BMI ≥ 25** this box differentiates those who presently are not overweight and never have been from those with a history of overweight.

15. **Epigrammatic support/ instruct on weight management.** Those who are not overweight and never have been should be advised of the importance of staying in this category.

16. **Sporadic monitoring the weight, BMI, and waist circumference.** WLCs should receive periodic monitoring of their weight, BMI, and waist circumference. WLCs who are not overweight or have no history of overweight should be screened for weight gain every 1 year. This time span is a reasonable compromise between the need to identify weight gain at an early stage and the need to limit the time, effort, and cost of frequent measurements.

Ready or Not: Estimating Weight Loss

Estimating a WLC's readiness for weight loss and identifying possible variables related with weight loss achievement is a significant step in understanding the needs of WLCs. Nevertheless, it may be easier said than done. Researchers have tried for years with some achievement to identify predictors of weight loss. Such predictors would allow health care dietitians, before action, to recognize individuals who have a high or low probability of success. Suitable steps potentially could be taken to improve the chances of WLCs in the latter category.

Among biological variables, initial body weight and resting metabolic rate (RMR) are both positively related to weight loss. Heavier individuals tend to lose more weight than do lighter individuals, while the two groups tend to lose similar percentages of initial weight. Studies have not found that weight cycling is associated with a poorer treatment result. Behavioural predictors of weight loss have proved to be less reliable. Depression, anxiety, or binge eating may be associated with suboptimal weight loss, though findings have been contradictory. In the same way, measures of readiness or motivation to lose weight have generally failed to predict outcome. By contrast, self-efficacy—a WLC's report that she or he can perform the behaviours required for weight loss—is a modest but consistent predictor of success. Several studies have also suggested that positive coping skills contribute to weight control.

Who is excluded from Weight Loss Therapy?

WLCs for whom weight loss therapy is not appropriate are most pregnant or lactating women, persons with a serious uncontrolled psychiatric illness such as a major depression, and WLCs who have a variety of serious illnesses and for whom caloric restriction might exacerbate the illness. WLCs with active substance abuse and those with a history of anorexia nervosa or bulimia nervosa should be referred for specialized care.

A Brief Behavioural Assessment

Based on the results of the questionnaire and the checklists of the current DProf study (Andreou & Philippou) is suggested that dietitians should consider the following issues when assessing an obese individual's readiness for weight loss:

- **'Has the individual required weight loss on his or her own willingness?"** Weight loss efforts are unlikely to be successful if WLCs fell that they have been forced into treatment by family members, their employer, or their physician. Before initiating treatment, dietitians should determine whether WLCs recognize the need and benefits of weight reduction and want to lose weight.

- **'What actions have led the WLC to hunt for weight loss now?"** Responses to this question will provide information about the WLC's weight loss motivation and goals. In most cases, individuals have been obese for many years. Something has happened to make them look for weight loss. The motivator differs from person to person.
- **'What are the WLC's stress level and frame of mind?"** There may not be a perfect time to lose weight, but some are better than others. Individuals who report higher-than-usual stress levels with work, family life, or financial problems may not be able to focus on weight control. In such cases, treatment may be delayed until the stressor passes, thus increasing the changes of success. Briefly assess the WLC's mood to rule out major depression or other complications. Reports of poor sleep, a low mood, or lack of pleasure in daily activities can be followed up to determine whether intervention is needed: it is usually best to treat the mood disorder before undertaking weight reduction.
- **'Does the individual suffer from an eating disorder, in addition to obesity?"**
  Approximately 20 percent to 30 percent of obese individual who seek weight reduction at university clinics suffer from binge eating (DSM-IV 1994). This involves eating an unusually large amount of food and experiencing loss of control while overeating. Binge eaters are distressed by their overeating, which differentiates them from person who report that they 'just enjoy eating and eat too much." Ask WLCs which meals they typically eat and the times of consumption. Binge eaters usually do not have a regular meal plan; instead they snack throughout the day. Although some of these individuals respond well to weight reduction therapy, the greater the WLC's distress or

depression, or the more chaotic the eating pattern, the more likely there is a need for psychological or nutritional counseling.

Defining characteristics of Binge Eating Disorder:

Binge eating disorder is a relatively recently recognized disorder (it is sometimes referred to as compulsive overeating). Some researchers believe it is the most common of the eating disorders. Similar to bulimia nervosa, those with binge eating disorder frequently consume large amounts of food while feeling a lack of control over their eating. However, this disorder is different from bulimia nervosa because people with binge eating disorder usually do not purge (i.e. vomiting, laxatives, excessive exercise, etc) their bodies of the excess food they consume during a binge episode.

Diagnostic Criteria: DSM-IV

A. Recurrent episodes of binge eating. An episode is characterized by:

1. Eating a larger amount of food than normal during a short period of time (within any two hour period)
2. Lack of control over eating during the binge episode (i.e. the feeling that one cannot stop eating).

B. Binge eating episodes are associated with three or more of the following:

1. Eating until feeling uncomfortably full
2. Eating large amounts of food when not physically hungry
3. Eating much more rapidly than normal
4. Eating alone because you are embarrassed by how much you're eating
5. Feeling disgusted, depressed, or guilty after overeating

C. Marked distress regarding binge eating is present

D. Binge eating occurs, on average, at least 2 days a week for six months

E. The binge eating is not associated with the regular use of inappropriate compensatory behaviour (i.e. purging, excessive exercise, etc.) and does not occur exclusively during the course of bulimia nervosa or anorexia nervosa.

Some Warning Signs:

-Rapid weight gain or obesity

-Constant weight fluctuations

-Frequently eats an abnormal amount of food in a short period of time (usually less than two hours)

-Does not use methods to purge food

-Eats rapidly (i.e. frequently chewing without swallowing)

-Feeling a lack of control over one's eating (i.e. unable to stop)

-Eating alone, "secretive eating habits", hiding food, etc.

-Eating late at night

-Eating when not hungry

-Disgust and shame with self after overeating.

-Hoarding food (especially high calorie/junk food)

-Coping with emotional and psychological states such as stress, unhappiness or disappointment by eating.

-Eating large amounts of food without being hungry

-Consuming food to the point of being uncomfortable or even in pain

-Attribute ones successes and failures to weight

-Avoiding social situations especially those involving food.

- Depressed mood

-Anxious mood

Some medical consequences:

-Obesity

-Diabetes

-High blood pressure

-High cholesterol

-Kidney disease and/or failure

-Gallbladder disease

-Arthritis

-Bone deterioration

- Stroke

- Upper respiratory problems

-Skin disorders

-Menstrual irregularities

-Ovarian abnormalities
-Complications of pregnancy
-Depression, anxiety and other mood disorders
-Suicidal thoughts
-Substance abuse

Treatment Options:

Studies have found that people with binge eating disorder may find it harder than other people to continue in weight loss treatment. In addition, they may be more likely to regain weight quickly. These are some of the reasons that people with binge eating disorder may require treatment that focuses on their binge eating before they try to lose weight. Further, even those who are not overweight are frequently distressed by their binge eating and may benefit from treatment.

There are several methods currently used to treat binge eating disorder.

A. Cognitive-behavioural therapy: Method in which the client is taught techniques to monitor and change their eating habits, as well as to change the way they respond to difficult and stressful situations.

B. Interpersonal psychotherapy: Method in which the client is taught to examine their relationships with friends and family and to make changes in problem areas.

C. Medications: Antidepressants may be helpful for some individuals.

D. Self-help groups: These groups may be a good additional source of support for many.

Research is still trying to attempting to determine which method or combination of methods is the most effective in controlling binge eating disorder.

Often those who have binge eating disorder suffer with the disorder for years, feel ashamed, depressed may feel very alone. It is important to recognize that you are not alone, there are millions like you and there are successful treatment options available for you.

To determine the type of treatment that is best suited for your situation treatment options should be discussed with a licensed mental health practitioner who can assess your needs.

Source: Diagnostic and Statistical Manual of Mental Disorders 1994

- **'Does the person realize the need of therapy and consider having a successful outcome?"** Practitioner and WLC together should select a course of treatment and identify the changes in eating and activity habits that the WLC wishes to make. It is important to select activities that WLCs believe they can perform successfully. WLCs should feel that they have the time, desire, and skills to adhere to a program that you have planned together.
- **'How much weight does the person anticipate to lose and what other advantages does he or she expect?"** Obese individuals typically want to lose 2 or 3 times the 8 to 15 percent (Sarwer, 2009) often observed and are disappointed when they do not. Dietitians must help WLCs understand that modest weight losses frequently improve health complications of obesity. Progress should then be evaluated by achievement of these goals, which may include sleeping better, having more energy, reducing pain, and pursuing new hobbies or rediscovering old ones, particularly when weight loss slows and eventually stops.

Management of Overweight and Obesity

The initial goal of weight loss therapy for overweight WLCs is a reduction in body weight of about 10 percent. If this target is achieved, consideration may be given to further weight loss. In general, WLCs will wish to lose more than 10 percent of body weight; they will need to be counseled about the appropriateness of this initial goal (Foster et al 1997). Additional weight loss can be considered after this initial goal is achieved and maintained for 6 months. The rationale for the initial 10-percent goal is that a moderate weight loss of this magnitude can considerably decline the severity of obesity-associated risk factors. It is better to maintain a moderate weight loss over a prolonged period than to regain weight from a marked weight loss. The latter is counterproductive in terms of time, cost, and self-esteem.

Rate of Weight Loss

Based on the current study of DProf ***'The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Lifestyle Changes for Adults in Cyprus",*** a reasonable time to achieve a 10-percent reduction in body weight is 4 ½ months of therapy. To

achieve a significant loss of weight, an energy deficit must be created and maintained along with appropriate physical activity and behaviour modification. Weight should be lost at a rate of ½ to 1 kg per week, based on a caloric deficit between 500 and 1,000 kcal/day. After 4 ½ months, theoretically, this caloric deficit should result in a loss of between 9-18 kg. However, the average weight loss actually observed over this time is 11.96 kg. A greater rate of weight loss does not yield a better result at the end of 9 months year.

Goals for Weight Loss and Management

The following are general goals for weight loss and management:

- Reduce body weight
- Maintain a lower body weight over the long term
- Prevent further weight gain (a minimum goal)

It is hard for most WLCs to continue to lose weight after 6 months because of changes in resting metabolic rates and problems with loyalty to treatment strategies. Because energy requirements decrease as weight is decreased, diet and physical activity goals need to be revised so that an energy deficit is created at the lower weight, allowing the WLC to continue to lose weight. To achieve additional weight loss, the WLC must further decrease calories and/or increase physical activity. Many studies show that rapid weight reduction is almost always followed by gain of the lost weight. Moreover, with rapid weight reduction, there is an increased risk for gallstones and, possibly, electrolyte abnormalities.

Weight Maintenance at a Lower Weight

Once the goals of weight loss have been successfully achieved, maintenance of a lower body weight becomes the major challenge. In the past, obtaining the goal of weight loss was considered the end of weight loss therapy. Unfortunately, once WLCs are dismissed from clinical therapy, they frequently regain the lost weight.

After 18 weeks of weight loss, the rate at which the weight is lost usually declines, then plateaus.

The dietitian and WLC should recognize that, at this point, weight maintenance, the second phase of the weight loss effort, should take priority. Successful weight maintenance is defined as a regain of weight that is less than 3 kg in 2 years and a sustained reduction in waist circumference of at least4 cm (Wing, 2005). If a WLC wishes to lose more weight after a period of weight maintenance, the procedure for weight loss, outlined above, can be repeated.

After a WLC has achieved the targeted weight loss, the combined modalities of therapy (dietary therapy, physical activity, and behaviour therapy) must be continued indefinitely; otherwise, excess weight will likely be regained. Numerous strategies are available for motivating the WLC; all of these require that the practitioner continue to communicate frequently with the WLC. Long-term monitoring and encouragement can be accomplished in several ways: by regular clinic visits, at group meetings, or via telephone or e-mail. The longer the weight maintenance phase can be sustained, the better the prospects for long-term success in weight reduction.

Weight Management Techniques

Effective weight control involves multiple techniques and strategies including dietary therapy, physical activity, behaviour therapy, pharmacotherapy, and surgery as well as combinations of these strategies. Relevant treatment strategies can also be used to foster long-term weight control and prevention of weight gain.

Some strategies such as modifying dietary intake and physical activity can also impact on obesity-related comorbidities or risk factors. Since the diet recommended is a low calorie Step-1 diet, it not only modifies calorie intake but also reduces saturated fat, total fat, and cholesterol intake in order to help lower high blood cholesterol levels. The diet also includes the current recommendations for sodium, calcium and fiber intakes. Increased physical activity is not only important for weight loss and weight loss maintenance but also impacts on other comorbidities and risk factors such as high blood pressure, and high blood cholesterol levels. Reducing body weight in overweight and obese WLCs not only helps reduce the risk of these comorbidities from developing but also helps in their management.
Weight management techniques need to take into account the needs of individual WLCs so they should be

culturally sensitive and incorporate the WLC's perspectives and characteristics. Treatment of overweight and obesity is to be taken seriously since it involves treating an individual's disease over the long term as well as making modifications to a way of life for entire families.

Table 7 illustrates the therapies appropriate for use at different BMI levels taking into account the existence of other comorbidities or risk factors.

Table 7

A Guide to Selecting Treatment					
	BMI category				
Treatment	**25–26.9**	**27–29.9**	**30-34.9**	**35–39.9**	**≥ 40**
Diet, physical activity, and behavior therapy	With comorbidities	With comorbidities	+	+	+
Pharmacotherapy		With comorbidities	+	+	+
Surgery				With comorbidities	

Source: National Institutes of Health 2000

- Prevention of weight gain with lifestyle therapy is indicated in any WLC with a BMI ≥ 25 kg/m^2, even without comorbidities, while weight loss is not necessarily recommended for those with a BMI of 25–29.9 kg/m^2 or a high waist circumference, unless they have two or more comorbidities.
- Combined therapy with a low-calorie diet (LCD), increased physical activity, and behaviour therapy provide the most successful intervention for weight loss and weight maintenance.
- Consider pharmacotherapy only if a WLC has not lost 0.5 kg per week after 6 months of combined lifestyle therapy.

The + represents the use of indicated treatment regardless of comorbidities.

Dietary Therapy

In the majority of overweight and obese WLCs, adjustment of the diet will be required to reduce caloric intake. Dietary therapy includes instructing WLCs in the modification of their diets to achieve a decrease in caloric intake. A diet that is individually planned to help create a deficit of 500 to 1,000 kcal/day should be an integral part of any program aimed at achieving a weight loss of 1/2 to 1 per week. A key element of the current recommendation is the use of a moderate reduction in caloric intake, which is designed to achieve a slow, but progressive, weight loss. Ideally, caloric intake should be reduced only to the level that is required to maintain weight at a desired level. If this level of caloric intake is achieved, excess weight will gradually decrease. In practice, somewhat greater caloric deficits are used in the period of active weight loss, but diets with a very low-calorie content are to be avoided. Finally, the composition of the diet should be modified to minimize other cardiovascular risk factors.

The centerpiece of dietary therapy for weight loss in overweight or obese WLCs is a low calorie diet (LCD). This diet is different from a very low calorie diet (VLCD) (less than 800 kcal/day). The recommended LCD in this guide, i.e., the Step I Diet, also contains the nutrient composition that will decrease other risk factors such as high blood cholesterol and hypertension. The composition of the diet is presented in Table 8. In general, diets containing 1,000 to 1,200 kcal/day should be selected for most women; a diet between 1,200 kcal/day and 1,600 kcal/day should be chosen for men and may be appropriate for women who weigh 75 kg or more, or who exercise regularly. If the WLC can stick with the 1,600 kcal/day diet but does not lose weight you may want to try the 1,200 kcal/day diet. If a WLC on either diet is hungry, you may want to increase the calories by 100 to 200 per day.

VLCDs should not be used routinely for weight loss therapy because they require special monitoring and supplementation (NIH 1993). VLCDs are used only in very limited circumstances by specialized dietitians experienced in their use. Moreover, clinical trials show that LCDs are as effective as VLCDs in producing weight loss after 1 year (Wadden et al 1994).

Table 8

Low calorie diet (LCD)
1,000 to 1,200 kcal/day for most women 1,200 to 1,600 kcal/day should be chosen for men

Source: Wadden and Foster 1992

Successful weight reduction by LCDs is more likely to occur when consideration is given to a WLC's food preferences in tailoring a particular diet. Care should be taken to ensure that all of the recommended dietary allowances are met; this may require the use of a dietary or vitamin supplement. Dietary education is necessary to assist in the adjustment to a LCD. Educational efforts should pay particular attention to the following topics:

- Energy value of different foods.
- Food composition—fats, carbohydrates (including dietary fiber), and proteins.
- Evaluation of nutrition labels to determine caloric content and food composition.
- New habits of purchasing—give preference to low-calorie foods.
- Food preparation -avoid adding high-calorie ingredients during cooking (e.g., fats and oils).
- Avoiding overconsumption of high-calorie foods (both high-fat and high-carbohydrate foods).
- Adequate water intake.
- Reduction of portion sizes.
- Limiting alcohol consumption.

Table 9

Low-Calorie Step I Diet	
Nutrient	**Recommended Intake**
Calories[1]	Approximately 500 to 1,000 kcal/day reduction from usual intake
Total fat[2]	30 percent or less of total calories
Saturated fatty acids[3]	8 to 10 percent of total calories
Monounsaturated fatty acids	Up to 15 percent of total calories
Polyunsaturated fatty acids	Up to 10 percent of total calories
Cholesterol[3]	<300 mg/day
Protein[4]	Approximately 15 percent of total calories
Carbohydrate[5]	55 percent or more of total calories
Sodium chloride	No more than 100 mmol/day (approximately 2.4 g of sodium or approximately 6 g of sodium chloride)
Calcium[6]	1,000 to 1,500 mg/day
Fiber[5]	20 to 30 g/day

Source: National Institutes of Health 2000

1. A reduction in calories of 500 to 1,000 kcal/day will help achieve a weight loss of ½ to 1 kg /week. Alcohol provides unneeded calories and displaces more nutritious foods. Alcohol consumption not only increases the number of calories in a diet but has been associated with obesity in epidemiologic studies (Tremblay et al. 1995) (Gruchow et al 1985) (de Castro et al 1990) (Veenstra et al 1993) as well as in experimental studies (Tremblay et al 1995 (Tremblay et al 1996) (Poppitt et al 1996) (Foltin et al 1993).The impact of alcohol calories on a person's overall caloric intake needs to be assessed and appropriately controlled.
2. Fat-modified foods may provide a helpful strategy for lowering total fat intake but will only be effective if they are also low in calories and if there is no compensation by calories from other foods.
3. WLCs with high blood cholesterol levels may need to use the Step II diet to achieve further reductions in LDL-cholesterol levels; in the Step II diet, saturated fats are reduced to less than 7 percent of total calories, and cholesterol levels to less than 200 mg/day. All of the other nutrients are the same as in Step I.
4. Protein should be derived from plant sources and lean sources of animal protein.
5. Complex carbohydrates from different vegetables, fruits, and whole grains are good sources of

vitamins, minerals, and fiber. A diet rich in soluble fiber, including oat bran, legumes, barley, and most fruits and vegetables, may be effective in reducing blood cholesterol levels. A diet high in all types of fiber may also aid in weight management by promoting satiety at lower levels of calorie and fat intake. Some authorities recommend 20 to 30 grams of fiber daily, with an upper limit of 35 grams (Butrum et al 1988) (U.S Public Health Services 1988) (ADA 1988).

6. During weight loss, attention should be given to maintaining an adequate intake of vitamins and minerals. Maintenance of the recommended calcium intake of 1,000 to 1,500 mg/day is especially important for women who may be at risk of osteoporosis (NIH consensus Conference 2000).

Physical Activity

Physical activity should be an essential part of weight loss therapy and weight maintenance. At first, moderate levels of physical activity for 30 to 45 minutes, 3 to 5 days per week, should be encouraged.

An increase in physical activity is a significant part of weight loss therapy (CDC 1996), even though it will not guide to a considerably better weight loss than diet alone over 6 months (Katzel et al 1995). Most weight loss occurs because of decreased caloric intake. continued physical activity is most helpful in the avoidance of weight take back (Pate et al 1995) (NIH Consensus Conference 1996).In addition, physical activity is helpful for minimizing risks for cardiovascular disease and type 2 diabetes, beyond that produced by weight reduction alone. Many people live sedentary lives, have modest guidance or skills in physical activity, and are difficult to motivate toward increasing their activity. For these reasons, starting a physical activity regimen may need supervision for some people. The need to avoid injury throughout physical activity is a high priority. Extremely obese persons may need to start with simple exercises that can be intensified gradually. The practitioner must decide whether exercise testing for cardiopulmonary disease is needed before embarking on a new physical activity regimen. This decision should be based on a WLC's age, symptoms, and concomitant risk factors.

All adults should set a long-term goal to gather at least 30 minutes or more or moderate – intensity physical activity on most, and if possible all, days of the week.

For most obese WLCs, physical activity should be initiated slowly, and the intensity should be increased slowly. Initial activities may be increasing small tasks of daily living such as taking the stairs or walking or swimming at a slow pace. With time, depending on progress, the amount of weight lost, and useful capacity, the WLC may engage in more strenuous activities. Some of these include fitness walking, cycling, rowing, cross-country skiing, aerobic dancing, and jumping rope. Jogging provides a high-intensity aerobic exercise, but it can lead to orthopedic injury. If jogging is desired, the WLC's ability to do this must first be assessed. The availability of a safe environment for the jogger is also a necessity. Competitive sports, such as tennis and volleyball, can provide an enjoyable form of physical activity for many, but again, care must be taken to avoid injury, especially in older people.

As the examples l show, a moderate amount of physical activity can be achieved in a variety of ways. People can select activities that they enjoy and that fit into their daily lives. Because amounts of activity are functions of duration, intensity, and frequency, the same amounts of activity can be obtained in longer sessions of moderately intense activities (such as brisk walking) as in shorter sessions of more strenuous activities (such as running).

A schedule of daily walking is an attractive form of physical activity for many people, particularly those who are overweight or obese. The WLC can start by walking 10 minutes, 3 days a week, and can build to 30 to 45 minutes of more intense walking at least 3 days a week and increase to most, if not all, days (Pate et al 1995) (NIH Consensus Conference 1996).With this routine, an additional 100 to 200 kcal/day of physical activity can be expended. Caloric expenditure will vary depending on the individual's body weight and the intensity of the activity.

Table 10.

Examples of Moderate Amounts of Physical Activity*		
Common Chores	**Sporting Activities**	
Washing and waxing a car for 45–60 minutes	Playing volleyball for 45–60 minutes	**Less Vigorous, More Time†**
Washing windows or floors for 45–60 minutes	Playing touch football for 45 minutes	
Gardening for 30–45 minutes	Walking 1¾ miles in 35 minutes (20 min/mile)	
Wheeling self in wheelchair for 30–40 minutes	Basketball (shooting baskets) for 30 minutes	
Pushing a stroller 1½ miles in 30 minutes	Bicycling 5 miles in 30 minutes	
Raking leaves for 30 minutes	Dancing fast (social) for 30 minutes	
Walking 2 miles in 30 minutes (15 min/mile)	Water aerobics for 30 minutes	
Shoveling snow for 15 minutes	Swimming laps for 20 minutes	
Stairwalking for 15 minutes	Basketball (playing a game) for 15–20 minutes	
	Jumping rope for 15 minutes	**More Vigorous, Less Time**
	Running 1½ miles in 15 minutes (15 min/mile)	

* A moderate amount of physical activity is roughly equivalent to physical activity that uses approximately 150 calories of energy per day, or 1,000 calories per week.

† Some activities can be performed at various intensities; the suggested durations correspond to expected intensity of effort.

Source: National Institutes of Health 2000

This schedule can be modified to other forms of physical activity, but walking in above all attractive because of its safety and convenience. With time, a larger weekly amount of physical activity can be performed that would normally cause a greater weight loss if it were not rewarded by a higher caloric intake.

Reducing sedentary time, i.e., time spent watching television or playing video games, is another approach to increasing activity. WLCs should be encouraged to build physical activities into each day. Examples include leaving public transportation one stop before the usual one, parking farther than usual from work or shopping, and walking up stairs instead of taking elevators or escalators. New forms of physical activity should be recommended (e.g., gardening, walking a dog daily, or new athletic activities). Engaging in physical activity can be facilitated by identifying a safe area to perform the activity (e.g., community parks, gyms, pools, and health clubs). However, when these sites are not available, an area of the home can be

identified and perhaps outfitted with equipment such as a stationary bicycle or a treadmill. Health care professionals should support WLCs to plan and schedule physical activity 1 week in advance, plan the time needed to do it, and document their physical activity by keeping a diary and recording the duration and intensity of exercise. The following are examples of activities at different levels of intensity. A moderate amount of physical activity is roughly equivalent to physical activity that uses approximately 150 calories of energy per day, or 1,000 calories per week.

- For the beginner, or someone who leads a very sedentary lifestyle, **very light activity** would include increased standing activities, room painting, pushing a wheelchair, yard work, ironing, cooking, and playing a musical instrument.

- **Light activity** would include slow walking (24 min/mile), garage work, carpentry, house cleaning, child care, golf, sailing, and recreational table tennis.

- **Moderate activity** would include walking a 15-minute mile, weeding and hoeing a garden, carrying a load, cycling, skiing, tennis, and dancing.

- **High activity** would include jogging a mile in 10 minutes, walking with a load uphill, tree felling, heavy manual digging, basketball, climbing, and soccer.

- **Other key activities** would include flexibility exercises to attain full range of joint motion, strength or resistance exercises, and aerobic conditioning.

Behaviour Therapy

Behaviour therapy provides methods for overcoming barriers to compliance with dietary therapy and/or increased physical activity, and these methods are important components of weight loss treatment. The following approach is designed to assist the caregiver in delivering behaviour therapy. The importance of individualizing behavioural strategies to the needs of the WLC must be emphasized for behaviour therapy, as it was for diet and exercise strategies (Wadden et al 1992).

In addition, the practitioner must assess the WLC's motivation to enter weight loss therapy and the WLC's readiness to implement the plan. Then the practitioner can take appropriate steps to motivate the WLC for treatment.

Making the Most of the WLC Visit Consider Attitudes, Beliefs, and Histories.

In the WLC-provider interaction, individual histories, attitudes, and beliefs may affect both parties. The diagnosis of obesity is rarely new or news for the WLC. Except for WLCs with very recent weight gain, the WLC brings into the consulting room a history of dealing with a frustrating, troubling, and visible problem. Obese people are often the recipients of scorn and discrimination from strangers and, sometimes, hurtful comments from previous health care professionals. The WLC with obesity may be understandably defensive about the problem.

- *Be careful to communicate a nonjudgmental attitude that distinguishes between the weight problem and the WLC with the problem. Ask about the WLC's weight history and how obesity has affected his or her life. Express your concerns about the health risks associated with obesity, and how obesity is affecting the WLC.*

Similarly, most providers have had some frustrating experiences in dealing with WLCs with weight problems. Appropriate respect for the difficulty of long-term weight control may mutate into a reflexive sense of futility. When efforts to help WLCs lose weight are unsuccessful, the provider may be disappointed and may blame the WLC for the failure, seeing obese people as uniquely noncompliant and difficult. Providers too may feel some antifat prejudice.

- *Objectively examine your own attitudes and beliefs about obesity and obese people. Remember, obesity is a chronic disease, like diabetes or hypertension. In a sense, WLCs are struggling against their own body's coordinated effort to stop them from losing weight. Remember, compliance with most long-term treatment regimens that require behaviour change is poor. Keep your expectations realistic regarding the ease, amount, speed, and permanence of weight change.*

Establish Rapport with the WLC.

The WLC must be an active partner in the consultation and must participate in setting goals for behaviour change. It is the WLC who must make the changes to achieve weight loss; the WLC already has goals concerning weight loss and how to achieve it. These goals may be different from those the provider would select. The provider can be a source of general information, perspective, support, and some measure of guidance but cannot cause the WLC to meet goals that he or she does not endorse.

- *When weight is first brought up, ask what the WLC's weight goals are. You may indicate that the WLC's weight goals are more ambitious than necessary for health improvement, but acknowledge that the WLC may have many other reasons for selecting a different goal. Distinguish between the long-term result of weight loss and the short-term behaviour changes (diet, activity, etc.) that are the means to that end. Emphasize that the WLC will judge which specific goals to attempt and that your review of goal attainment is meant to evaluate the plan, not the WLC. Also, emphasize that the most important thing the WLC can do is to keep return appointments, even if goals have not been met.*

WLCs must be active associates and contribute in setting goals for behavioural changes.

Set Realistic Goals

Setting goals should be a collaborative activity. From all the available dietary and physical activity changes that might be made, a small number should be selected on the basis of their likely impact on weight and health, the WLC's current status, and the WLC's willingness and ability to implement them. Once goals are selected, an action plan can be devised to implement change.

- *After considering the recommended dietary and physical activity guidelines, the WLC should be encouraged to select two or three goals that he or she is willing and able to take on. If the WLC does not select an area that appears in need of change, inquire about the perceived costs and benefits of that achievement, without presenting it as mandatory. ('One thing that seems very important for most WLCs is physical activity. What are your thoughts about increasing your activity level?") Assess the WLC's perceived ability to meet a specific goal. ('On a scale from 1 to 10, how confident are you that you can meet this goal?")*

Effective goals are specific, attainable, and forgiving (less than perfect). Thus, 'exercise more" would become 'walk for 30 minutes, 3 days a week, for now." *Shaping* is a behavioural technique that involves selecting a series of short-term goals that get closer and closer to the ultimate goal (e.g., an initial reduction of fat intake from 40 percent of calories to 35 percent of calories and later to 30 percent). Once the WLC has selected a goal, address briefly what has to be done to achieve it. ('What are the best days for you to take your walks? What time of day is best for you? What arrangements will you need to make for child care?") Provide the WLC with a written behavioural 'prescription" listing the selected goals.

The Goal Setting and Recording for W3.eight Management (see Appendix J) can be copied for use in the chart to keep track of the WLC's goals and weight changes. Write down the WLC's goals on the Food and Activity Diary (see Appendix K).

Focal point on positive changes and adapts a problem-solving approach towards the deficits shortfall. Weight control is a voyage, not an end.

Develop the joint venture

Follow up visits are occasions for monitoring health and weight status and for monitoring responses to any medication regimens. They also provide the opportunity to assess progress toward the goals selected at the previous visit, to provide support and additional information, and to establish goals for the next visit. Imperfect goal attainment is often the norm. Focus on the positive changes, and adopt a problem-solving approach toward the shortfalls. This is achieved by communicating that the goal, not the WLC, is at issue.

- *While in the waiting room, the WLC can write down the outcomes of the previous goals, effects of the various aspects of the treatment program (diet, activity, and medication), items to discuss with you, and possible targets for new goals. In the consultation, a matter-of-degree approach can be communicated by questions such as 'How many days a week was you able to walk?" rather than 'Did you meet your walking goal?" Successes should receive positive attention and praise. If the WLC has not successfully met a desired goal, emphasize the extent to which he or she approached the goal. ('So even though you weren't able to walk 4 days each week, you did get out there at least twice a week.")*

Acknowledge the challenging nature of weight control by adopting problem-solving responses to goals that are not fully met. Emphasize that examining the circumstances of unmet goals can lead to new and more effective strategies. ('What do you think interfered with your walking plans on the days you didn't walk?") Emphasize that weight control is a journey, not a destination, and that some missteps are inevitable opportunities to learn how to be more successful.

- *Set goals for the next visit in collaboration with the WLC. These goals should be based on the outcome of the previous goals, consideration of the WLC-selected targets, and assessment of the WLC's status. If a previous goal was missed by a wide margin, it may be useful to lower the goal somewhat.*

Follow up.

Frequency of treatment contact is a major determinant of success at weight control, but the contact need not be limited to direct, in-person visits with the provider. Use whatever means exist to maintain frequent contact with WLCs.

- *Encourage WLCs to drop by the office between consultations for a weight check (with the office nurse or other staff), to bring in the Weekly Food and Activity Diary, to view educational videotapes, or to pick up other materials. Such interim visits can be scheduled or left on an as-needed basis, depending on the WLC's needs and preferences. Educational material or responses from you or your staff may be transmitted by mail, e-mail, or telephone. A member of your staff may contact the WLC between visits for support.*

Help the Weight Loss Candidate (WLC) to Modify Behaviours

Proven behaviour modification techniques can be used to assist WLCs in weight control. Some can be communicated readily in person or via written materials. Goals may include the use of one or more of these techniques. Copy the written handouts in Appendix J for your WLCs.

- ***Self-monitoring*** *refers to observing and recording some aspect of behaviour, such as caloric intake, exercise sessions, medication usage, etc., or an outcome of these behaviours, such as changes in body weight. Self-monitoring of a behaviour usually changes the behaviour in the desired direction and can produce real-time records for your review. Some WLCs find that specific self-monitoring forms make it easier, while others prefer to use their own recording system. Recording dietary intake (food choices, amounts, times), although seen as a chore by some WLCs, is a very useful application of self-monitoring. Although some WLCs prefer daily weighing and others do better with less frequent steps on the scale, regular self-monitoring of weight is crucial for long-term maintenance.*

- ***Rewards*** *can be used to encourage attainment of behavioural goals, especially those that have been difficult to reach. An effective reward is something that is desirable, timely, and contingent on meeting the goal. WLC-administered rewards may be tangible (e.g., a movie, music CD, or payment toward buying a more costly item) or intangible (e.g., an afternoon off work or an hour of quiet time away from family). Numerous small rewards, delivered for meeting smaller goals, are preferable to bigger rewards that require a long, difficult effort.*

- ***Stimulus control*** *changes involve learning what social or environmental cues seem to encourage undesired eating and then modifying those cues. For example, a WLC may learn from reflection or from self-monitoring records that he or she is more likely to overeat while watching television, or whenever treats are on display by the office coffeepot or when around a certain friend. The resulting strategies may be to sever the association of eating from the cue (do not eat while watching television), avoid or eliminate the cue (leave the coffee room immediately after pouring coffee), or change the circumstances surrounding the cue (plan to meet with the friend in a setting where food is not available). In general, visible and accessible food items are often cues for unplanned eating.*

Dietary behaviour changes can make it easier to eat less without feeling deprived. An important change

is to slow the rate of eating to allow satiety signals to begin to develop before the end of the meal. Another tactic is to use smaller plates so that moderate portions do not appear meager. Changing the scheduling of eating can be helpful for WLCs who skip or delay meals, then overeat later.

Center on the Important Issues

Improvement of the WLC's health is the goal of obesity treatment. Monitoring progress is a continuous process of motivational importance to the WLC and provider. Simple, clear records of body weight, relevant risk factors, other health parameters, and goal attainment should be kept.

- *Use simple charts or graphs to summarize changes in weight and the associated risk factors that were present initially or suggested by the WLC's family history. For example, for a WLC presenting with a BMI of 33, hypertension, and a family history of type 2 diabetes, a chart might include successive measures of weight, BMI, waist circumference, blood pressure, and fasting blood glucose. Copy these records for the WLC. Provide the WLC with a written behavioural 'prescription" listing the selected goals. The* Goal Setting and Recording for Weight Management (*see Appendix J) can be copied for use in the chart to keep track of the WLC's goals and weight changes.*

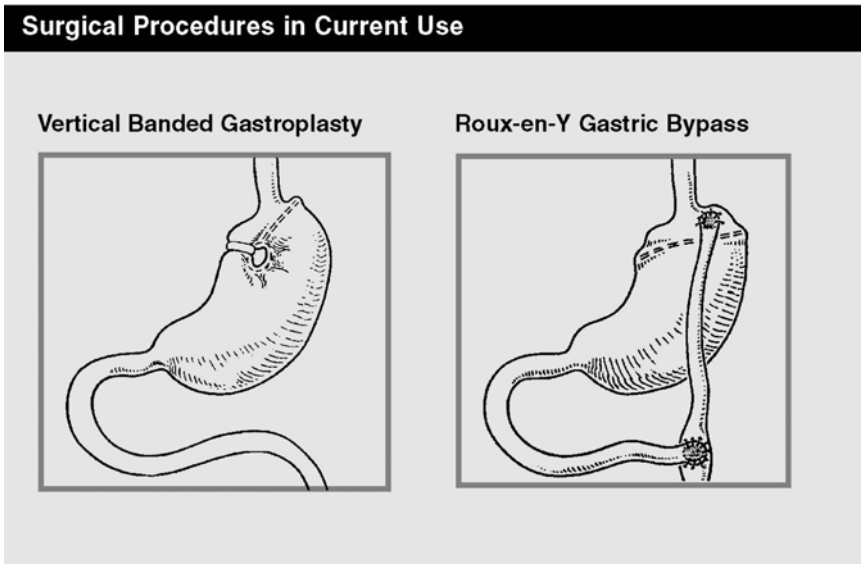
Focus on what matters

Improvement of the WLC's health is the goal of obesity treatment. Monitoring progress is a continuous process of motivational importance to the WLC and provider.

Weight Loss Surgery is an option for weight reduction in WLCs with clinically severe obesity, i.e., a BMI ≥40, or a BMI ≥ 35 with comorbid conditions. Weight loss surgery should be reserved for WLCs in whom other methods of treatment have failed and who have clinically severe obesity (once commonly referred to as 'morbid obesity" National Institutes of Health Consensus development, 1992). Weight loss surgery provides medically significant sustained weight loss for more than 5 years in most WLCs. Two types of operations have proven to be effective: those that restrict gastric volume (banded gastroplasty) and those that, in addition to limiting food intake, also alter digestion (Roux-en-Y gastric bypass). See Figure 5.

Lifelong medical monitoring after surgery is a necessity. Perioperative complications vary with weight and the overall health of the individual. In the published literature, young WLCs without comorbidities with a BMI < 50 kg/m^2 who have undergone surgery have mortality rates less than 1 percent, whereas massively obese WLCs with a BMI > 60 kg/m^2 who are also diabetic, hypertensive and in cardiopulmonary failure may have mortality rates that range from 2 to 4 percent. Operative complications, including anastomotic leak, subphrenic abscess, splenic injury, pulmonary embolism, wound infection, and stoma stenosis, occur in less than 10 percent of WLCs (Pories et al 1995).

Figure 4



An integrated program that provides guidance on diet, physical activity, and psychosocial concerns before and after surgery is necessary. Most WLCs fare remarkably well with reversal of diabetes, control of hypertension, marked improvement in mobility, return of fertility, cure of pseudo-tumor cerebri, and significant improvement in quality of life. Late complications are uncommon, but some WLCs may develop incisional hernias, gallstones, and, less commonly, weight loss failure and dumping syndrome. WLCs who do not follow the instructions to maintain an adequate intake of vitamins and minerals may develop deficiencies of vitamin B_{12} and iron with anemia. Neurologic symptoms may occur in unusual cases. Thus, surveillance should include monitoring indices of inadequate nutrition. Documentation of improvement in preoperative comorbidities is beneficial and advised.

Medical Evaluation, Treatment, and Monitoring of the Obese WLCs on a Weight a Health Professional's Approach and Perspective

- **Pretreatment Evaluation**

  A physical examination and routine laboratory evaluation should be performed on an obese WLC starting a weight loss regimen if this has not been done within the past year. The medical history and physical exam should focus on causes and complications of obesity. BMI should be calculated and waist circumference measured to better assess risk and to offer measures of outcome in addition to weight loss. Although the causes of obesity are not fully known, certain factors clearly play a role. Family history is important because of the strong heritability of obesity; polycystic ovarian disease and hypothyroidism are known causes of overweight. The use of antidepressants, lithium, phenothiazines, glucocorticoids, progestational hormones, cyproheptadine and perhaps other antihistamines, sulfonylureas, insulin, and other medications is associated with weight gain. In some cases, it may be possible to change medications in favor of those that do not promote weight gain.

  The practitioner should search for complication of obesity, such as hypertension, type 2 diabetes, hyperlipidemia, atherosclerotic cardiovascular disease, osteoarthritis of the lower extremities, gallbladder disease, gout, and cancers. In men, it is associated with colorectal and prostate cancer; in women it is associated with endometrial, gallbladder, cervical, ovarian, and breast cancer. Signs and symptoms of these disorders may have been overlooked by the WLC and should be carefully reviewed by the practitioner. For example, weight loss is frequently a symptom of the onset of type 2 diabetes. Some WLCs may come to their initial visit, proud of their recent weight loss and unaware of its significance.

  The practitioner should also be alert to the possible presence of obstructive sleep apnea, a disorder that is often overlooked in obese WLCs. Symptoms and signs include very loud snoring or cessation of breathing during sleep, which is often followed by a loud clearing breath, then brief awakening. The WLC may be a restless sleeper; some find that they can sleep comfortably only in the sitting position. The WLC's partner may best describe these symptoms. Daytime fatigue, with episodes of sleepiness at inappropriate times, and morning headaches also occur. On exam, hypertension, narrowing of the upper

airway, scleral injection, and leg edema, secondary to pulmonary hypertension may be observed. Laboratory studies may show polycythemia. If signs of sleep apnea are present, referral to a pulmonologist, or sleep specialist, is appropriate.

Examine the thyroid and look for manifestations of hypothyroidism. In addition, leg edema, cellulitis, acanthosis nigricans (coarse pigmented skin that is a sign of hyperinsulinemia), and intertriginous rashes with signs of skin breakdown are commonly seen in the very obese.

- **Laboratory Tests**

  Baseline and diagnostic laboratory test may include assessment of electrolytes, liver function tests, complete blood counts, total cholesterol, HDL- and LDL-cholesterol, triglycerides, and thyroid-stimulating hormone, or full thyroid function tests. A recent baseline electrocardiogram should be performed on the basis of finding from the initial evaluation.

Lifestyle, Diet, and Physical Activity

Food and exercise reports should be reviewed throughout WLC's couselling visits in order to review obedience with the prescribed dietary and exercise recommendations.

Numerous visits to weigh WLCs and assess their obedience, diet, and exercise may be associated with better weight loss.

Check WLC's progress

In general, healthy WLCs on a weight loss program should be seen within 2 to 4 weeks of initial conduct in order to check both the treatment's effectiveness and its side effects. Visits about every 2-4 weeks are sufficient through the first 3 months if the WLC has a positive weight loss and few side effects. More frequent visits may be required based on clinical decision, mostly if the WLC has medical problems. Blood pressure, pulse, and weight should be monitored each visit, with waist circumference measured intermittently. After 6 months less frequents visits are required but always based on individual needs

Medical progress

Prior to start treatment, results of the physical examination and laboratory tests should be discussed with the WLC. Stress should be located on any new findings, mainly those related with obesity that would be predictable to improve with weight loss. The WLC should focus on improvements in these health parameters, rather than focus on achieving an ideal body weight or an also large weight loss that may or may not be possible. Improvements in health complications should be discussed on a continuing basis. Many WLCs find this a useful motivator because, at some point, weight is likely to stay steady at a level above their ideal weight. By focusing WLCs on the medical rather than the aesthetic benefits of weight loss, you may better help them to reach their goals.

Weight loss for older age

There is an increasing occurrence of obesity among older people.

Age alone should not stop treatment for obesity in adult male and female women. A choice to give up obesity treatment in an older adult should be guided by an assessment of the possible benefits of weight reduction for everyday performance and decrease of the risk of possible heart problems, as well as the WLC's motivation for weight reduction. Being obese does not appear to benefit older people. Nevertheless, concern must be taken to make sure that any weight reduction program minimizes the probability of unfavorable effects on bone health or other aspects of nutritional status. There is little evidence at present to show that obesity treatment should be withheld from adult male and female on the basis of age alone up to 80 years of age.

The higher incidence of cardiovascular risk factors in overweight opposed to nonoverweight people is obviously observed at older ages. In addition, obesity is a major predictor of functional limitations and mobility impairments in older adults. Weight loss reduces risk factors and improves functional status in older persons in the same manner as in younger adults. Weight loss requires appropriate nutritional and exercise counseling, including resistance training and moderate weight-bearing exercise. Nevertheless, the weight management program must frequently be independently modified to have a desirable result. (Hubert et al 1993;Galanos et al 1994;Launer et al 1994;Ensrud et al 1994;Coakley et al 1998;Visser et al 1998;Apovian et al 1996).

Age alone should not prevent treatment for obesity. Though, care must be taken to reduce the possibility of unfavorable effects on bone health or other aspects of nutritional status.

Introduction to the Appendices

In order to lose weight and maintain weight loss, your WLCs need to know what to do and be motivated to do it. These Appendices contain all the basic information they need to eat better, get in better condition, and improve health. You can help them to decide what's best for them, and this is a good place to start.

Appendix A. Anthropometrics

BODY MASS INDEX

BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Height cms (metres)	Body Weight (kilograms)																
147cm (1.47m)	41	44	45	48	50	52	54	56	59	61	63	65	67	69	72	73	76
150cm (1.50m)	43	45	47	49	52	54	56	58	60	63	65	67	69	72	74	76	78
152cm (1.52m)	44	46	49	51	54	56	58	60	63	65	67	69	72	74	76	79	81
155cm (1.55m)	45	48	50	53	55	57	60	62	65	67	69	72	74	77	79	82	84
157cm (1.57m)	47	49	52	54	57	59	62	64	67	69	72	74	77	79	82	84	87
160cm (1.60m)	49	51	54	56	59	61	64	66	69	72	74	77	79	82	84	87	89
163cm (1.63m)	50	53	55	58	61	64	66	68	71	74	77	79	82	84	87	89	93
165cm (1.65m)	52	54	57	60	63	65	68	71	73	76	79	82	84	87	90	93	95
168cm (1.68m)	54	56	59	62	64	67	70	73	76	78	81	84	87	90	93	95	98
170cm (1.70m)	55	57	61	64	66	69	72	75	78	81	84	87	90	93	96	98	101
172cm (1.72m)	57	59	63	65	68	72	74	78	80	83	86	89	92	95	98	101	104
175cm (1.75m)	58	61	64	68	70	73	77	80	83	86	89	92	95	98	101	104	107
178cm (1.78m)	60	63	66	69	73	76	79	82	85	88	92	95	98	101	104	107	110
180cm (1.80m)	62	65	68	71	75	78	81	84	88	91	94	98	101	104	107	110	113
183cm (1.83m)	64	67	70	73	77	80	83	87	90	93	97	100	103	107	110	113	117
185cm (1.85m)	65	68	72	75	79	83	86	89	93	96	99	103	107	110	113	117	120
188cm (1.88m)	67	70	74	78	81	84	88	92	95	99	102	106	109	113	116	120	123
191cm (1.91m)	69	73	76	80	83	87	91	94	98	102	105	109	112	116	120	123	127
193cm (1.93m)	71	74	78	82	86	89	93	97	100	104	108	112	115	119	123	127	130
BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35

BMI	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Height cms (metres)	**Body Weight (kilograms)**																		
147cm (1.47m)	78	80	82	84	87	89	91	93	95	98	100	102	104	106	108	111	112	115	117
150cm (1.50m)	81	83	85	88	90	92	94	96	98	101	103	105	108	110	112	114	117	119	121
152cm (1.52m)	83	86	88	90	93	95	98	100	102	104	107	109	111	113	116	118	121	123	125
155cm (1.55m)	86	88	91	93	96	98	101	103	105	108	110	112	115	117	120	122	125	127	129
157cm (1.57m)	89	92	94	97	99	102	104	107	109	112	114	116	119	121	124	126	129	131	134
160cm (1.60m)	92	94	97	100	102	105	108	110	112	115	117	120	123	126	128	130	132	136	138
163cm (1.63m)	95	98	100	103	105	108	111	113	116	119	121	124	127	129	132	134	137	140	142
165cm (1.65m)	98	101	103	106	109	112	114	117	120	123	125	128	131	133	136	139	142	144	147
168cm (1.68m)	101	104	107	109	112	115	118	121	123	126	129	132	135	137	140	143	146	149	151
170cm (1.70m)	104	107	110	113	116	118	122	124	127	130	132	136	139	142	145	147	151	153	156
172cm (1.72m)	107	110	113	116	119	122	125	128	131	134	137	140	143	146	149	152	155	158	161
175cm (1.75m)	110	113	117	119	123	126	129	132	135	138	141	144	147	151	153	156	159	162	166
178cm (1.78m)	113	117	120	123	126	129	132	136	139	142	145	148	151	155	158	161	162	167	171
180cm (1.80m)	117	120	123	127	130	132	137	140	143	146	149	153	156	159	162	166	169	172	175
183cm (1.83m)	120	123	127	130	133	137	140	143	147	151	153	157	160	164	167	170	174	177	180
185cm (1.85m)	123	127	131	134	137	141	144	147	151	154	158	161	165	168	171	175	178	182	185
188cm (1.88m)	127	130	134	137	141	145	148	151	155	159	162	166	169	173	176	180	183	187	191
191cm (1.91m)	130	134	137	141	145	148	152	156	159	163	166	170	174	177	181	185	188	192	195
193cm (1.93m)	134	138	142	145	149	152	156	160	164	167	171	175	179	182	186	190	193	197	201
BMI	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54

Source: National Lung, Heart and Blood Institute 2009

Weight Chart for Women

Weight in pounds, based on ages 25-59 with the lowest mortality rate

Height	Small Frame	Medium Frame	Large Frame
4'10"	102-111	109-121	118-131
4'11"	103-113	111-123	120-134
5'0"	104-115	113-126	122-137
5'1"	106-118	115-129	125-140
5'2"	108-121	118-132	128-143
5'3"	111-124	121-135	131-147
5'4"	114-127	124-138	134-151
5'5"	117-130	127-141	137-155
5'6"	120-133	130-144	140-159
5'7"	123-136	133-147	143-163
5'8"	126-139	136-150	146-167
5'9"	129-142	139-153	149-170
5'10"	132-145	142-156	152-173
5'11"	135-148	145-159	155-176
6'0"	138-151	148-162	158-179

Weight Chart for Men

Weight in pounds or kilos, based on ages 25-59 with the lowest mortality rate

Height	Small Frame	Medium Frame	Large Frame
5'2"	128-134	131-141	138-150
5'3"	130-136	133-143	140-153
5'4"	132-138	135-145	142-156
5'5"	134-140	137-148	144-160
5'6"	136-142	139-151	146-164
5'7"	138-145	142-154	149-168
5'8"	140-148	145-157	152-172
5'9"	142-151	148-160	155-176
5'10"	144-154	151-163	158-180
5'11"	146-157	154-166	161-184
6'0"	149-160	157-170	164-188
6'1"	152-164	160-174	168-192
6'2"	155-168	164-178	172-197
6'3"	158-172	167-182	176-202
6'4"	162-176	171-187	181-207

METROPOLITAN HEIGHT AND WEIGHT TABLES FOR
MEN AND WOMEN ON METRIC BASIS
According to Frame, Ages 25-59
WOMEN
Weight in Kilograms (In Indoor Clothing)*

HEIGHT	**SMALL**	**MEDIUM**	**LARGE**
(In Shoes)+	**FRAME**	**FRAME**	**FRAME**
Centimeters			
148	46.4 - 50.5	49.6 - 55.1	53.7 - 59.8
149	46.6 - 51.0	50.0 - 55.5	54.1 - 60.3
150	46.7 - 51.3	50.3 - 55.9	54.4 - 60.9
151	46.9 - 51.7	50.7 - 56.4	54.6 - 61.4
152	47.1 - 52.1	51.1 - 57.0	55.2 - 61.9
153	47.4 - 52.5	51.5 - 57.5	55.6 - 62.4
154	47.8 - 53.0	51.9 - 58.0	56.2 - 63.0
155	48.1 - 53.6	52.2 - 58.6	56.8 - 63.6
156	48.5 - 54.1	52.7 - 59.1	57.3 - 64.1
157	48.8 - 54.6	53.2 - 59.6	57.8 - 64.6
158	49.3 - 55.2	53.8 - 60.2	58.4 - 65.3
159	49.8 - 55.7	54.3 - 60.7	58.9 - 66.0
160	50.3 - 56.2	54.9 - 61.2	59.4 - 66.7
161	50.8 - 56.7	55.4 - 61.7	59.9 - 67.4
162	51.4 - 57.3	55.9 - 62.3	60.5 - 68.1
163	51.9 - 57.8	56.4 - 62.8	61.0 - 68.8
164	52.5 - 58.4	57.0 - 63.4	61.5 - 69.5
165	53.0 - 58.9	57.5 - 63.9	62.0 - 70.2
166	53.6 - 59.5	58.1 - 64.5	62.6 - 70.9

167	54.1 - 60.0	58.7 - 65.0	63.2 - 71.7
168	54.6 - 60.5	59.2 - 65.5	63.7 - 72.4
169	55.2 - 61.1	59.7 - 66.1	64.3 - 73.1
170	55.7 - 61.6	60.2 - 66.6	64.8 - 73.8
171	56.2 - 62.1	60.7 - 67.1	65.3 - 74.5
172	56.8 - 62.6	61.3 - 67.6	65.8 - 75.2
173	57.3 - 63.2	61.8 - 68.2	66.4 - 75.9
174	57.8 - 63.7	62.3 - 68.7	66.9 - 76.4
175	58.3 - 64.2	62.8 - 69.2	67.4 - 76.9
176	58.9 - 64.8	63.4 - 69.8	68.0 - 77.5
177	59.5 - 65.4	64.0 - 70.4	68.5 - 78.1
178	60.0 - 65.9	64.5 - 70.9	69.0 - 78.6
179	60.5 - 66.4	65.1 - 71.4	69.6 - 79.1
180	61.0 - 66.9	65.6 - 71.9	70.1 - 79.6
181	61.6 - 67.5	66.1 - 72.5	70.7 - 80.2
182	62.1 - 68.0	66.6 - 73.0	71.2 - 80.7
183	62.6 - 68.5	67.1 - 73.5	71.7 - 81.2

MEN

Weight in Kilograms (In Indoor Clothing)*

HEIGHT (In Shoes)+	SMALL FRAME	MEDIUM FRAME	LARGE FRAME
Centimeters			
158	58.3 - 61.0	59.6 - 64.2	62.8 - 68.3
159	58.6 - 61.3	59.9 - 64.5	63.1 - 68.8
160	59.0 - 61.7	60.3 - 64.9	63.5 - 69.4
161	59.3 - 62.0	60.6 - 65.2	63.8 - 69.9
162	59.7 - 62.4	61.0 - 65.6	64.2 - 70.5
163	60.0 - 62.7	61.3 - 66.0	64.5 - 71.1
164	60.4 - 63.1	61.7 - 66.5	64.9 - 71.8
165	60.8 - 63.5	62.1 - 67.0	65.3 - 72.5
166	61.1 - 63.8	62.4 - 67.6	65.6 - 73.2
167	61.5 - 64.2	62.8 - 68.2	66.0 - 74.0
168	61.8 - 64.6	63.2 - 68.7	66.4 - 74.7
169	62.2 - 65.2	63.8 - 69.3	67.0 - 75.4
170	62.5 - 65.7	64.3 - 69.8	67.5 - 76.1
171	62.9 - 66.2	64.8 - 70.3	68.0 - 76.8
172	63.2 - 66.7	65.4 - 70.8	68.5 - 77.5
173	63.6 - 67.3	65.9 - 71.4	69.1 - 78.2
174	63.9 - 67.8	66.4 - 71.9	69.6 - 78.9
175	64.3 - 68.3	66.9 - 72.4	70.1 - 79.6
176	64.7 - 68.9	67.5 - 73.0	70.7 - 80.3

177	65.0 - 69.5	68.1 - 73.5	71.3 - 81.0
178	65.4 - 70.0	68.6 - 74.0	71.8 - 81.8
179	65.7 - 70.5	69.2 - 74.6	72.3 - 82.5
180	66.1 - 71.0	69.7 - 75.1	72.8 - 83.3
181	66.6 - 71.6	70.2 - 75.8	73.4 - 84.0
182	67.1 - 72.1	70.7 - 76.5	73.9 - 84.7
183	67.7 - 72.7	71.3 - 77.2	74.5 - 85.4
184	68.2 - 73.4	71.8 - 77.9	75.2 - 86.1
185	68.7 - 74.1	72.4 - 78.6	75.9 - 86.8
186	69.2 - 74.8	73.0 - 79.3	76.6 - 87.6
187	69.8 - 75.5	73.7 - 80.0	77.3 - 88.5
188	70.3 - 76.2	74.4 - 80.7	78.0 - 89.4
189	70.9 - 76.9	74.9 - 81.5	78.7 - 90.3
190	71.4 - 77.6	75.4 - 82.2	79.4 - 91.2
191	72.1 - 78.4	76.1 - 83.0	80.3 - 92.1
192	72.8 - 79.1	76.8 - 83.9	81.2 - 93.0
193	73.5 - 79.8	77.6 - 84.8	82.1 - 93.9

- Indoor clothing weighing 2.3 kilograms for men and 1.4 kilograms for women.+ Shoes with 2.5 cm heels

Source: Halls Steven 2008

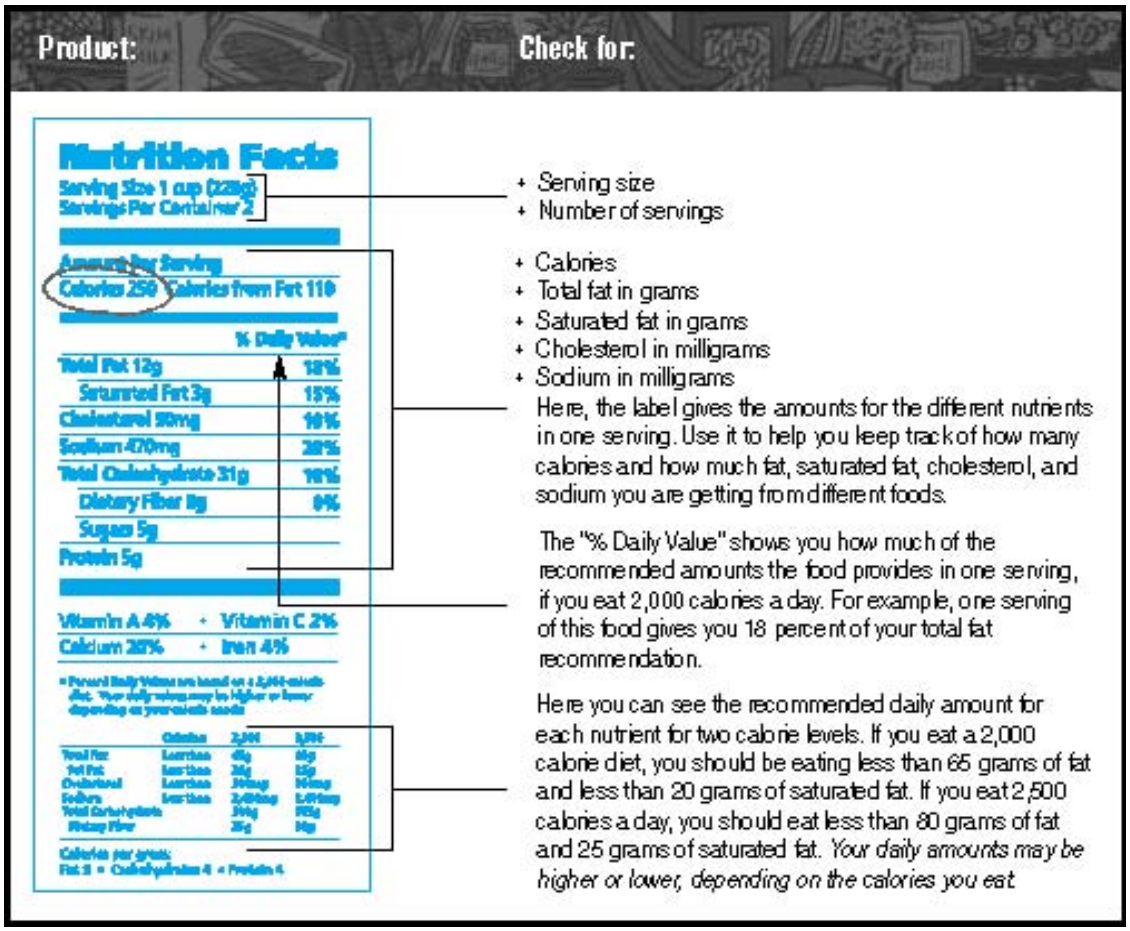
Appendix B. Shopping - Food Labeling - Traffic Lights

Foods Lower in Calories and Fat

Use this guide to help you shop for foods that are nutritious and lower in calories and fat to help you achieve your weight goal. Learning how to read a Nutrition Facts food label will help you save time in the store and fill your kitchen with low calorie foods.

Read labels as you shop. Pay attention to the serving size and the servings per container. All labels list total calories and fat in a serving size of the product. Compare the total calories in the product you choose with others like it; choose the one that is lowest in calories and fat. Below is a label that identifies important information.

To achieve your weight goal, you may need to eat much less than this reference amount. For example, if you eat 1,600 calories per day, your total daily fat limit should be 53 grams (30 percent calories from fat) and 18 grams of saturated fat (10 percent calories from fat). If you eat 1,200 calories per day, your total daily fat limit should be 40 grams (30 percent calories from fat), and your total daily saturated fat limit would be 13 grams (10 percent calories from fat).



Source: US Department of Health and Human Services 2010

Fat vs. Calories

A calorie is a calorie is a calorie whether it comes from fat or carbohydrate. Anything eaten in excess can lead to weight gain. You can lose weight by eating fewer calories and by increasing your physical activity. Reducing the amount of fat and saturated fat that you eat is one easy way to limit your overall calorie intake. However, eating fat free or reduced fat foods isn't always the answer to weight loss. This is especially true when you eat more of the reduced fat food than you would of the regular item. For example, if you eat twice as many fat free cookies, you have actually increased your overall calorie intake.

The following list of foods and their reduced fat varieties will show you that just because a product is fat free; it doesn't mean that it is 'calorie free." And, calories do count!

Fat Free or Reduced Fat		**Regular**	
	Calories		**Calories**
Reduces fat peanut butter, 2T	187	Regular peanut butter, 2T	191
Cookies:		*Cookies:*	142
Reduced fat chocolate chip cookies, 3 cookies (30g)	118	Regular chocolate chip cookies, 3 cookies (30g)	
Fat free fig cookies, 2 cookies (30g) 	102	Regular fig cookies, 2 cookies (30g)	111
Ice cream:		*Ice cream:*	
Nonfat vanilla frozen yogurt (<1% fat), ½ cup	100	Regular whole milk vanilla frozen yogurt (3-4% fat), ½ cup	104 
Light vanilla ice cream (7% fat), ½ cup	111	Regular vanilla ice cream (11% fat), ½ cup	133
Fat free caramel topping, 2T	103	Caramel topping, homemade with butter, 2T	103
Low fat granola cereal, aprox. ½ cup (55g)	213	Regular granola cereal approx. ½ cup (55g)	257
Low fat blueberry muffin, 1 small (2 ½ inch)	131	Regular blueberry muffin, 1 small (2 ½ inch)	138
Baked tortilla chips, 1 oz 	113	Regular tortilla chips, 1 oz	143
Low fat cereal bar, 1 bar (40g)	130	Regular cereal bar, 1 bar (40g) 	140

How to Understand and Use the Nutrition Facts Label

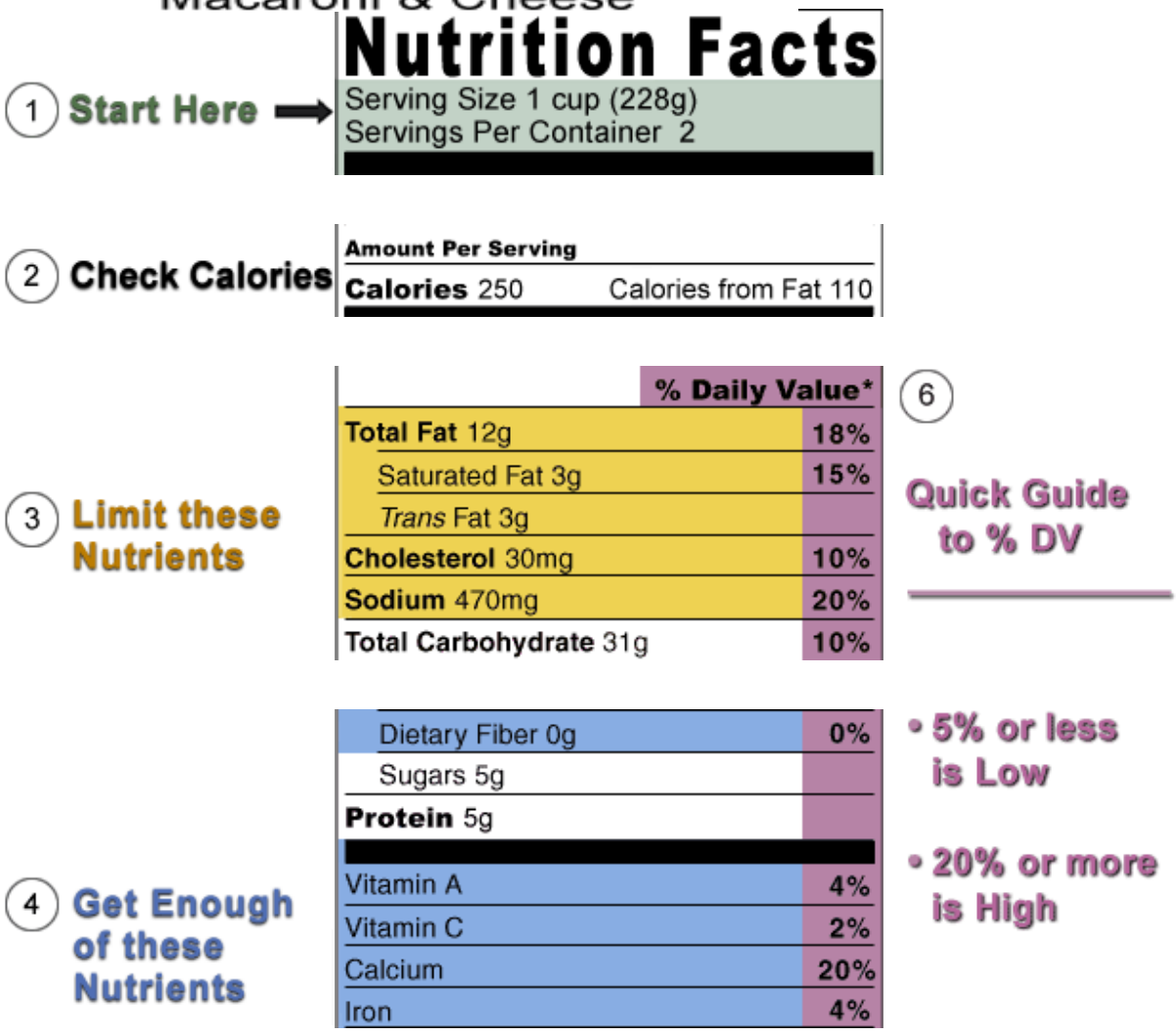
People look at food labels for different reasons. But whatever the reason, many consumers would like to know how to use this information more effectively and easily. The following label-building skills are intended to make it easier for you to use nutrition labels to make quick, informed food choices that contribute to a healthy diet.

The Nutrition Facts Label - An Overview:

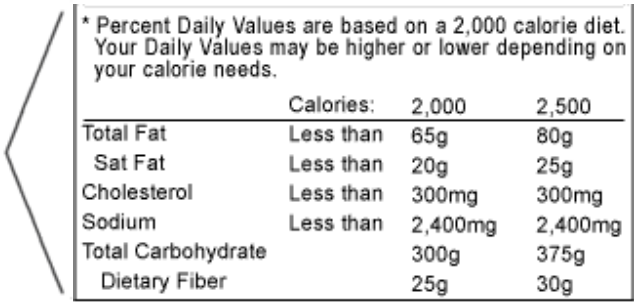
The information in the example below (see #1-4 and #6 on the sample nutrition label below), can vary with each food product; it contains product-specific information (serving size, calories, and nutrient information). The bottom part (see #5 on the sample label below) contains a footnote with Daily Values (DVs) for 2,000 and 2,500 calorie diets. This footnote provides recommended dietary information for important nutrients, including fats, sodium and fiber. The footnote is found only on larger packages and does not change from product to product.

In the following Nutrition Facts label we have colored certain sections to help you focus on those areas that will be explained in detail. You will not see these colors on the food labels on products you purchase.

Sample label for Macaroni & Cheese



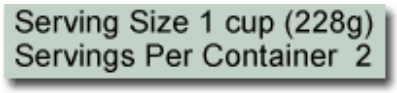
5 **Footnote**



* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

1 **The Serving Size**



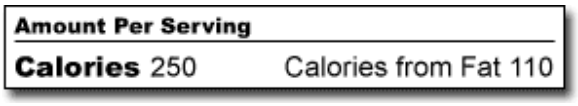
(#1 on sample label):

The first place to start when you look at the Nutrition Facts label is the serving size and the number of servings in the package. Serving sizes are standardized to make it easier to compare similar foods; they are provided in familiar units, such as cups or pieces, followed by the metric amount, e.g., the number of grams. The size of the serving on the food package influences the number of calories and all the nutrient amounts listed on the top part of the label. **Pay attention to the serving size, especially how many servings there are in the food package. Then ask them, "How many servings am I consuming"? (e.g., 1/2 serving, 1 serving, or more)** In the sample label, one serving of macaroni and cheese equals one cup. If you ate the whole package, you would eat **two** cups. That doubles the calories and other nutrient numbers, including the %Daily Values as shown in the sample label.

Example					
	Single Serving	**%DV**		**Double Serving**	**%DV**
Serving Size	1 cup (228g)			2 cups (456g)	
Calories	250			500	
Calories from Fat	110			220	
Total Fat	12g	18%		24g	36%
Trans Fat	1.5g			3g	
Saturated Fat	3g	15%		6g	30%
Cholesterol	30mg	10%		60mg	20%
Sodium	470mg	20%		940mg	40%
Total Carbohydrate	31g	10%		62g	20%
Dietary Fiber	0g	0%		0g	0%
Sugars	5g			10g	
Protein	5g			10g	
Vitamin A		4%			8%
Vitamin C		2%			4%
Calcium		20%			40%
Iron		4%			8%

2 Calories (and Calories from Fat)

Calories provide a measure of how much energy you get from a serving of this food. Many people consume more calories than they need without meeting recommended intakes for a number of nutrients. The calorie section of the label can help you manage the weight (i.e., gain, lose, or maintain.) **Remember: the number of servings you consume determines the number of calories you actually eat (the portion amount).**



(#2 on sample label):

In the example, there are 250 calories in one serving of this macaroni and cheese. How many calories from fat are there in ONE serving? Answer: 110 calories, which means almost half the calories in a single serving, come from fat. What if you ate the whole package content? Then, you would consume two servings, or 500 calories, and 220 would come from fat.

General Guide to Calories

- 40 Calories is low
- 100 Calories is moderate
- 400 Calories or more is high

The **General Guide to Calories** provides a general reference for calories when you look at a Nutrition Facts label. This guide is based on a 2,000 calorie diet.

Eating too many calories per day is linked to overweight and obesity.

3 4 The Nutrients: How Much?

(#3 and 4 on sample label):

Look at the top of the nutrient section in the sample label. It shows you some key nutrients that impact on the health and separates them into two main groups:

Limit These Nutrients

Total Fat 12g	**18%**
Saturated Fat 3g	**15%**
Trans Fat 3g	
Cholesterol 30mg	**10%**
Sodium 470mg	**20%**

(#3 on sample label):

The nutrients listed first are the ones Europeans/Americans generally eat in adequate amounts, or even too much. They are identified in yellow as **Limit these Nutrients.** Eating too much fat, saturated fat, *trans* fat, cholesterol, or sodium may increase the risk of certain chronic diseases, like heart disease, some cancers, or high blood pressure.

Important: Health experts recommend that you keep the intake of saturated fat, *trans* fat and cholesterol as low as possible as part of a nutritionally balanced diet.

Get Enough of These

Dietary Fiber 0g	**0%**
Vitamin A	**4%**
Vitamin C	**2%**
Calcium	**20%**
Iron	**4%**

(#4 on sample label):

Most Europeans and Americans don't get enough dietary fiber, vitamin A, vitamin C, calcium, and iron in their diets. They are identified in blue as **Get Enough of these Nutrients**. Eating enough of these nutrients can improve the health and help reduce the risk of some diseases and conditions. For example, getting enough calcium may reduce the risk of osteoporosis, a condition that results in brittle bones as one *age*. Eating a diet high in dietary fiber promotes healthy bowel function. Additionally, a diet rich in fruits, vegetables, and grain products that contain dietary fiber, particularly soluble fiber, and low in saturated fat and cholesterol may reduce the risk of heart disease.

<u>Remember</u>: You can use the Nutrition Facts label not only to help *limit* those nutrients you want to cut back on but also to *increase* those nutrients you need to consume in greater amounts.

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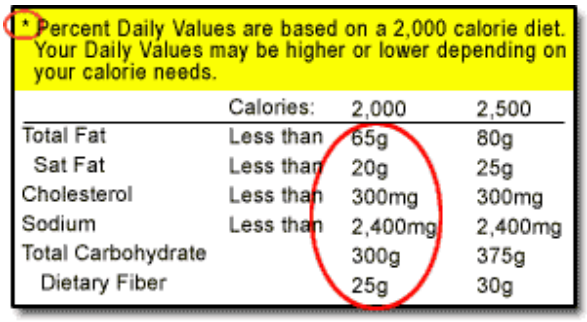
5 Understanding the Footnote on the Bottom of the Nutrition Facts Label


* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

(#5 on sample label)

Note the * used after the heading "%Daily Value" on the Nutrition Facts label. It refers to the Footnote in the lower part of the nutrition label, which tells you "**%DVs are based on a 2,000 calorie diet**". This statement must be on all food labels. But the remaining information in the full footnote may not be on the package if the size of the label is too small. When the full footnote does appear, it will always be the same. It doesn't change from product to product, because it shows recommended dietary advice --it is not about a specific food product.

Look at the amounts circled in red in the footnote--these are the Daily Values (DV) for each nutrient listed and are based on public health experts' advice. DVs are recommended levels of intakes. DVs in the footnote are based on a 2,000 or 2,500 calorie diet. Note how the DVs for some nutrients change, while others (for cholesterol and sodium) remain the same for both calorie amounts.

How the Daily Values Relate to the %DVs

Look at the example below for another way to see how the Daily Values (DVs) relate to the %DVs and dietary guidance. For each nutrient listed there is a DV, a %DV, and dietary advice or a goal. If you follow this dietary advice, you will stay within public health experts' recommended upper or lower limits for the nutrients listed, based on a 2,000 calorie daily diet.

Examples of DVs versus %DVs

Based on a 2,000 Calorie Diet

Nutrient	DV	%DV	Goal
Total Fat	65g	= 100%DV	Less than
Sat Fat	20g	= 100%DV	Less than
Cholesterol	300mg	= 100%DV	Less than
Sodium	2400mg	= 100%DV	Less than
Total Carbohydrate	300g	= 100%DV	At least
Dietary Fiber	25g	= 100%DV	At least

Source: US Department of Health and Human Services 2010

Upper Limit - Eat "Less than"...

The nutrients that have "upper daily limits" are listed first on the footnote of larger labels and on the example above. Upper limits means it is recommended that you stay below - eat "less than" - the Daily

Value nutrient amounts listed per day. For example, the DV for Saturated fat (in the yellow section) is 20g. This amount is 100% DV for this nutrient. What is the goal or dietary advice? To eat "less than" 20 g or 100%DV for the day.

Lower Limit - Eat "At least"...

Now look at the section in blue where dietary fiber is listed. The DV for dietary fiber is 25g, which is 100% DV. This means it is recommended that you eat "at least" this amount of dietary fiber per day.

The DV for Total Carbohydrate (section in white) is 300g or 100%DV. This amount is recommended for a balanced daily diet that is based on 2,000 calories, but can vary, depending on the daily intake of fat and protein.

Now let's look at the %DVs.

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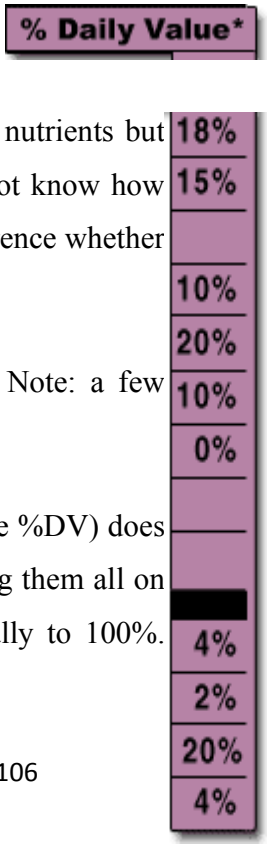
6 **The Percent Daily Value (%DV):**



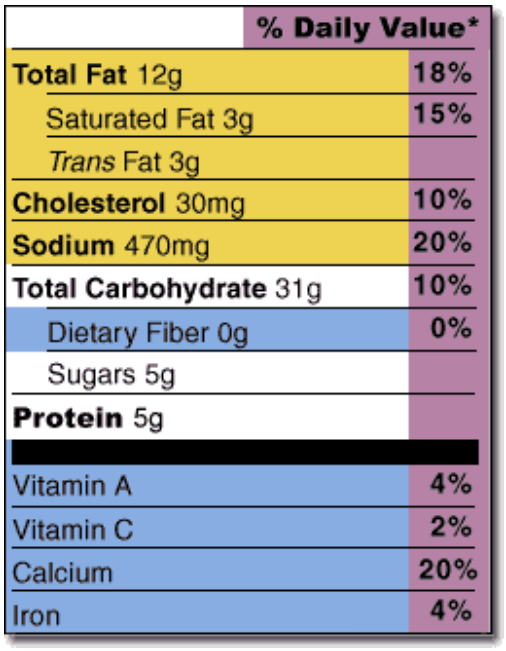
The % Daily Values (%DVs) is based on the Daily Value recommendations for key nutrients but only for a 2,000 calorie daily diet--not 2,500 calories. You, like most people, may not know how many calories you consume in a day. But you can still use the %DV as a frame of reference whether or not you consume more or less than 2,000 calories.

The %DV helps you determine if a serving of food is high or low in a nutrient. Note: a few nutrients, like *trans* fat, do not have a %DV--they will be discussed later.

Do you need to know how to calculate percentages to use the %DV? No, the label (the %DV) does the math for you. It helps you interpret the numbers (grams and milligrams) by putting them all on the same scale for the day (0-100%DV). The %DV column doesn't add up vertically to 100%.

Instead each nutrient is based on 100% of the daily requirements for that nutrient (for a 2,000 calorie diet). This way you can tell high from low and know which nutrients contribute a lot, or a little, to the **daily** recommended allowance (upper or lower).

Quick Guide to %DV:



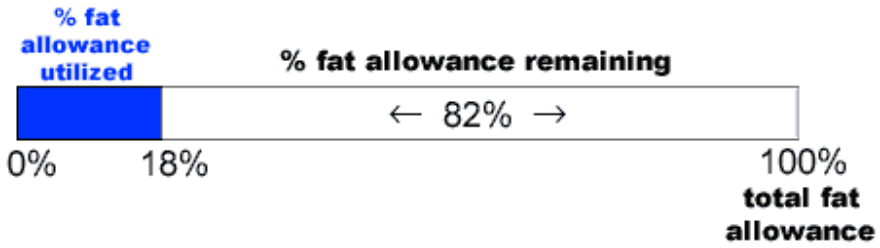
	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 3g	
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

5%DV or less is low and 20%DV or more is high (#6 on sample label):

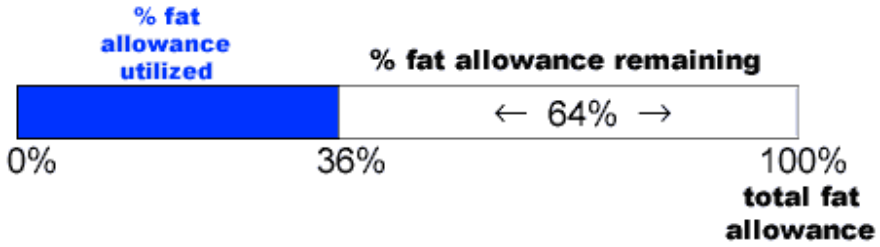
This guide tells you that **5%DV or less is low** for all nutrients, those you want to limit (e.g., fat, saturated fat, cholesterol, and sodium), or for those that you want to consume in greater amounts (fiber, calcium, etc). As the **Quick Guide** shows, **20%DV or more is high** for all nutrients.

Example: Look at the amount of Total Fat in one serving listed on the sample nutrition label. Is 18%DV contributing a lot or a little to the fat limit of 100% DV? Check the **Quick Guide to %DV**. 18%DV, which is below 20%DV, is not yet high, but what if you ate the whole package (two servings)? You would double that amount, eating 36% of the daily allowance for Total Fat. Coming from just one food, that amount leaves you with 64% of the fat allowance (100%-36%=64%) for *all* of the other foods you eat that day, snacks and drinks included.

1 serving



2 servings



Using the %DV for:

Comparisons: The %DV also makes it easy for you to make comparisons. You can compare one product or brand to a similar product. Just make sure the serving sizes are similar, especially the weight (e.g. gram, milligram, ounces) of each product. It's easy to see which foods are higher or lower in nutrients because the serving sizes are generally consistent for similar types of foods, (see the comparison example at the end) except in a few cases like cereals.

Nutrient Content Claims: Use the %DV to help you quickly distinguish one claim from another, such as "reduced fat" vs. "light" or "nonfat." Just compare the %DVs for Total Fat in each food product to see which one is higher or lower in that nutrient--**there is no need to memorize definitions.** This works when comparing all nutrient content claims, e.g., less, light, low, free, more, high, etc.

Dietary Trade-Offs: You can **use the %DV to help you make dietary trade-offs** with other foods throughout the day. You don't have to give up a favorite food to eat a healthy diet. When a food you like is

high in fat, balance it with foods that are low in fat at other times of the day. Also, pay attention to how much you eat so that the **total** amount of fat for the day stays below 100%DV.

Nutrients With a %DV but No Weight Listed - Spotlight on Calcium:

Nutrition Facts

Serving Size 1 cup (236ml)
Servings Per Container 1

Amount Per Serving
Calories 80 Calories from Fat 0

	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Cholesterol Less than 5mg	**0%**
Sodium 120mg	**5%**
Total Carbohydrate 11g	**4%**
Dietary Fiber 0g	**0%**
Sugars 11g	
Protein 9g	**17%**

Vitamin A 10% • Vitamin C 4%
Calcium 30% • Iron 0% • Vitamin D 25%

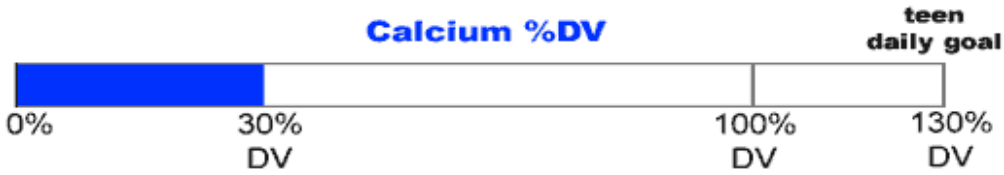
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

Calcium: Look at the %DV for calcium on food packages so you know how much one serving contributes to the *total amount you need* per day. Remember, a food with 20%DV or more contributes a lot of calcium to the daily total, while one with 5%DV or less contributes a little.

Experts advise adult consumers to consume adequate amounts of calcium, that is, 1,000mg or 100%DV in a daily 2,000 calorie diet. This advice is often given in milligrams (mg), but the Nutrition Facts label **only** lists a %DV for calcium.

For certain populations, they advise that adolescents, especially girls, consume 1,300mg (130%DV) and post-menopausal women consume 1,200mg (120%DV) of calcium daily. The DV for calcium on food labels is 1,000mg.

Don't be fooled -- always check the label for calcium because you can't make assumptions about the amount of calcium in specific food categories. Example: the amount of calcium in milk, whether skim or whole, is generally the same per serving, whereas the amount of calcium in the same size yogurt container (8oz) can vary from 20-45 %DV.

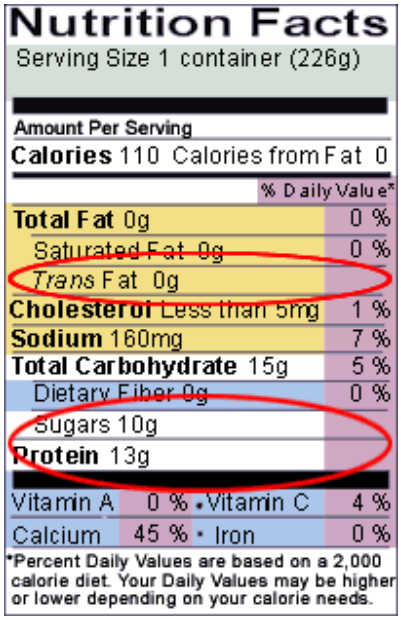


Equivalencies
30% DV = 300mg calcium = one cup of milk
100% DV = 1,000mg calcium
130% DV = 1,300mg calcium

Nutrients without a %DV: *Trans* Fats, Protein, and Sugars:

Note that *Trans* fat, Sugars and, Protein do not list a %DV on the Nutrition Facts label.

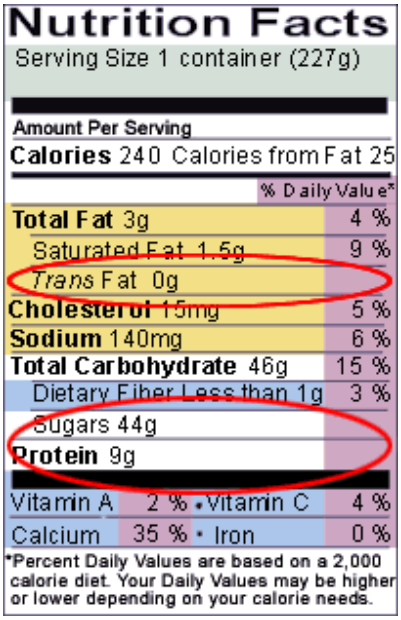
Plain Yogurt



Nutrition Facts	
Serving Size 1 container (226g)	
Amount Per Serving	
Calories 110 Calories from Fat 0	
	% Daily Value*
Total Fat 0g	0 %
Saturated Fat 0g	0 %
Trans Fat 0g	
Cholesterol Less than 5mg	1 %
Sodium 160mg	7 %
Total Carbohydrate 15g	5 %
Dietary Fiber 0g	0 %
Sugars 10g	
Protein 13g	
Vitamin A 0 % • Vitamin C	4 %
Calcium 45 % • Iron	0 %

*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

Fruit Yogurt



Nutrition Facts	
Serving Size 1 container (227g)	
Amount Per Serving	
Calories 240 Calories from Fat 25	
	% Daily Value*
Total Fat 3g	4 %
Saturated Fat 1.5g	9 %
Trans Fat 0g	
Cholesterol 15mg	5 %
Sodium 140mg	6 %
Total Carbohydrate 46g	15 %
Dietary Fiber Less than 1g	3 %
Sugars 44g	
Protein 9g	
Vitamin A 2 % • Vitamin C	4 %
Calcium 35 % • Iron	0 %

*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

Trans Fat: Experts could not provide a reference value for *trans* fat nor any other information that FDA believes is sufficient to establish a Daily Value or %DV. Scientific reports link *trans* fat (and saturated fat) with raising blood LDL ("bad") cholesterol levels, both of which increase the risk of coronary heart disease, a leading cause of death in the US.

Important: Health experts recommend that you keep the intake of saturated fat, *trans* fat and cholesterol as low as possible as part of a nutritionally balanced diet.

Protein: A %DV is required to be listed if a claim is made for protein, such as "high in protein". Otherwise, unless the food is meant for use by infants and children under 4 years old, none is needed. Current scientific evidence indicates that protein intake is not a public health concern for adults and children over 4 years of age.

Sugars: No daily reference value has been established for sugars because no recommendations have been made for the total amount to eat in a day. Keep in mind; the sugars listed on the Nutrition Facts label include

naturally occurring sugars (like those in fruit and milk) as well as those added to a food or drink. Check the ingredient list for specifics on added sugars.

Take a look at the Nutrition Facts label for the two yogurt examples. The plain yogurt on the left has 10g of sugars, while the fruit yogurt on the right has 44g of sugars in one serving.

Now look below at the ingredient lists for the two yogurts. Ingredients are listed in descending order of weight (from most to least). Note that no added sugars or sweeteners are in the list of ingredients for the plain yogurt, yet 10g of sugars were listed on the Nutrition Facts label. This is because there are no added sugars in plain yogurt, only naturally occurring sugars (lactose in the milk).

Plain Yogurt - contains no added sugars

INGREDIENTS: CULTURED PASTEURIZED GRADE A NONFAT MILK, WHEY PROTEIN CONCENTRATE, PECTIN, CARRAGEENAN.

Fruit Yogurt - contains added sugars

INGREDIENTS: CULTURED GRADE A REDUCED FAT MILK, APPLES, HIGH FRUCTOSE CORN SYRUP, CINNAMON, NUTMEG, NATURAL FLAVORS, AND PECTIN. CONTAINS ACTIVE YOGURT AND L. ACIDOPHILUS CULTURES.

If you are concerned about the intake of sugars, make sure that added sugars are not listed as one of the first few ingredients. Other names for added sugars include: corn syrup, high-fructose corn syrup, fruit juice concentrate, maltose, dextrose, sucrose, honey, and maple syrup.

To limit nutrients that have no %DV, like *trans* fat and sugars, compare the labels of similar products and choose the food with the lowest amount.

Comparison Example

REDUCED FAT MILK
2% Milk fat

NONFAT MILK

Fact: Both types of milk have the same amount of calcium, but the nonfat milk has no saturated fat and has 40 calories less per serving than the reduced fat milk.

Traffic light food labeling

Food sold prepacked may be labeled with a **traffic light label** showing at a glance the proportions of fat, saturated fats, sugar, and salt using traffic light signals for high ("red"), medium ("yellow") and low ("green") percentages for each of these ingredients. Foods with "green" indicators are healthier and to be preferred over those with "red" ones.[1] The label is on the front of the package and easier to spot and interpret than Guideline Daily Amount (GDA) labeling which will continue. The GDA is difficult to understand for many, including children, and does not lend itself to quick comparisons. The use of traffic light labeling is supported by many physician groups including the British Medical Association and welcomed by consumers (Kuczmarski et al 1997). Despite worries from some in the food industry that "red" foods would be shunned, the British Medical Association, Food Standards Agency and others agree that consumers interpret the labels sensibly, realize they can have red foods as a "treat", and they are easier to understand than lists of percentages (Kuczmarski et al 1997).

Criteria for Traffic Light Labeling for food pro 100 g			
Ingredient	**Green (low content)**	**Yellow (medium content)**	**Red (high content)**
Fat	less than 3 g	between 3 g and 20 g	more than 20 g
Saturated Fats	less than 1,5 g	between 1,5 g and 5 g	more than 5 g
Sugar	less than 5 g	between 5 g and 12,5 g	more than 12,5 g
Salt	less than 0,3 g	between 0,3 g and 1,5 g	more than 1,5 g
Criteria for Traffic Light Labeling for drinks pro 100 ml			
Ingredient	**Green (low content)**	**Yellow (medium content)**	**Red (high content)**
Fat	less than 1,5 g	between 1,5 g and 10 g	more than 10 g
Saturated Fats	less than 0,75 g	between 0,75 g and 2,5 g	more than 2,5 g
Sugar	less than 2,5 g	between 2,5 g and 6,3 g	more than 6,3 g
Salt	less than 0,3 g	between 0,3 g and 1,5 g	more than 1,5 g

Source: Food Standards Agency 2007

Currently the traffic light label is used in some European countries on a voluntary basis.

Traffic light labelling

You're standing in a supermarket aisle looking at two similar products, trying to decide which to choose. You want to make the healthier choice but, as usual, you're in a hurry. Well, help is at hand.

A growing number of supermarkets and food manufacturers are using traffic light colours on the labels of some products to help you make the choice.

What do the traffic light colours mean?

If we want to eat a healthy diet, one of the key things we should be doing is trying to cut down on fat (especially saturated fat), salt and added sugars.

Food products with traffic light labels on the front of the pack show you at-a-glance if the food you are thinking about buying has high, medium or low amounts of fat, saturated fat, sugars and salt, helping you get a better balance.

In addition to traffic light colours you will also see the number of grams of fat, saturated fat, sugars and salt in what the manufacturer or retailer suggests as a 'serving' of the food.

So, if you see a red light on the front of the pack, you know the food is high in something we should be trying to cut down on. It's fine to have the food occasionally, or as a treat, but try to keep an eye on how often you choose these foods, or try eating them in smaller amounts.

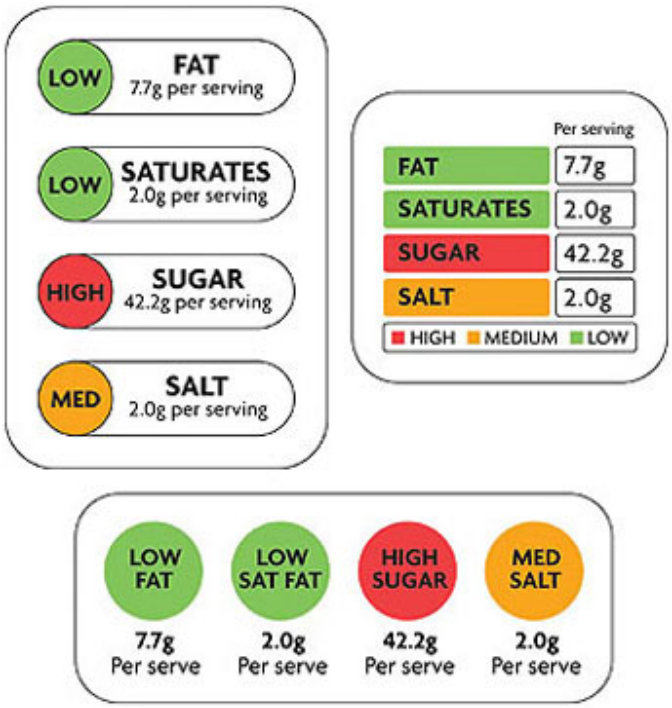
If you see amber, you know the food isn't high or low in the nutrient, so this is an OK choice most of the time, but you might want to go for green for that nutrient some of the time.

Green means the food is low in that nutrient. The more green lights, the healthier the choice.

Many of the foods with traffic light colours that you see in the shops will have a mixture of red, amber and greens. So, when you're choosing between similar products, try to go for more greens and ambers, and fewer reds, if you want to make the healthier choice.

The traffic light colours will make it easier for you to compare products at-a-glance. The label also tells you how much of each nutrient is in a portion, so if two labels have similar colours you can compare these figures, and choose the one that is lower to make a healthier choice.

But remember, it's all about getting the overall balance of our diet right.



What is GDAs?

The GDA values were established by a team of academic and industry experts for women, men and for a range of children's ages. GDAs are based on original UK Government set figures (Food and Drink Federation 2009).

Expert Working Groups, created by the panel on Dietary Reference Values (DRVs), set up in 1987 by the Committee on Medical Aspects of Food Policy (COMA) set DRVs for energy, protein, fats, sugars, starches, non-polysaccharides (NPS), 13 vitamins, 15 minerals and considered 18 other minerals(Food and Drink Federation, 2009).

Guideline Daily Amounts

Guideline Daily Amounts or GDAs are a guide to how many calories and nutrients people can consume each day for a healthy, balanced diet.

GDAs help make sense of nutrition information provided on food labels. They translate science into consumer friendly information, providing guidelines that help put nutrition information into the context of an overall diet.

They are called guidelines because that's exactly what they are – a guide, not a target. Whilst it's acceptable to stick pretty close to the GDA for calories, you should try to eat no more than the GDA for sugars, fat, saturates (saturated fat) and salt.

GDAs for different nutrients

Experts developed GDAs for calories and seven other main nutrients - protein, carbohydrate, sugars, fat, saturates (saturated fat), fibre and salt. The table below lists the different GDAs.

Guideline Daily Amount Values				
Typical values	**Women**	**Men**	**Children (5-10 years)**	**For Adults**
Calories	2,000 kcal	2,500 kcal	1,800 kcal	2000kcal
Protein	45 g	55 g	24 g	45g
Carbohydrate	230 g	300g	220 g	230g
Sugars	90 g	120 g	85 g	90g
Fat	70 g	95 g	70 g	70g
Saturates	20 g	30 g	20 g	20g
Fibre	24 g	24 g	15 g	24g
Salt	6 g	6 g	4 g	6g

Source: Food and Drink Federation 2009

GDAs for women, men and children

An individual's nutritional requirements can vary with gender, weight, activity levels and age, meaning some people may need to eat more and others less. As you will see in the table below there are separate GDAs for women, men and children. Typically, men require slightly more nutrients than women with the exception of salt and fibre.

The GDA value on front of pack labels are based on the average requirements of an adult woman. Using the values for women simplifies front of pack labels and is endorsed by experts as a good benchmark to use for all adults. It also helps consumers to avoid over consumption.

GDAs are guidelines for an average person of a healthy weight (i.e. someone who is not intending to lose or gain weight) and level of activity. It is a good idea to speak to the doctor or registered dietician if you have specific concerns about the diet or weight management.

Where you will find GDA information?

A typical back of pack nutrition panel (such as the table below example of wholegrain crackers below) gives information on the content of a product per 100g and per portion usually for calories and seven nutrients (protein, carbohydrate, sugars, fat, saturates (saturated fat), fibre and salt).

It may also give the contribution each nutrient makes towards the adult GDA as a percentage. In the table below you can see that the product contains 12.4g of protein per 100g and 0.7g per portion, which contributes 2 percent towards the adult GDA.

Typical back of pack nutrition and GDA information			
Nutrition information			
Typical values	**Per 100g**	**Per slice (approx. 5.7g)**	**% based on GDA for an Adult**
Calories	360 kcal	20 kcal	1%
Protein	12.4 g	0.7 g	2%
Carbohydrate	68.7 g	3.9 g	2%
Sugars	5.0 g	0.3 g	<1%
Fat	3.9 g	0.2 g	<1%
Saturates	0.5 g	Trace	<1%
Fibre	9.8 g	0.6 g	3%
Salt	0.8 g	0.05 g	1%

Source: Food and Drink Federation 2009

The panel may also display all eight GDAs in a format similar to the table below. Although this table contains GDA values for women, men and children (5-10 years) the GDA figures for the product in the column next to the per portion information are based on the GDAs for adult women. Remember that's what's on the front of pack too.

Typical back of pack nutrition and GDA information						
Nutrition information				Guideline Daily Amount		
Typical values	**Per 100g**	**Per slice (approx. 5.7g)**	**% based on GDA for an Adult**	**Woman**	**Man**	**Children (5-10 years)**
Calories	360 kcal	20 kcal	1%	2,000 kcal	2,500 kcal	1,800 kcal
Protein	12.4 g	0.7 g	2%	45 g	55 g	24 g
Carbohydrate	68.7 g	3.9 g	2%	230 g	300 g	220 g
Sugars	5.0 g	0.3 g	<1%	90 g	120 g	85 g
Fat	3.9 g	0.2 g	<1%	70 g	95 g	70 g
Saturates	0.5 g	Trace	<1%	20 g	30 g	20 g
Fibre	9.8 g	0.6 g	3%	24 g	24 g	15 g
Salt	0.8 g	0.05 g	1%	6 g	6 g	4 g

Source: Food and Drink Federation, 2009

You will see tables similar to this one above on the back of pack label of many foods and drink products. On the front you will often find the GDA label.

Appendix C. Nutrient and Calorie Modifications

These low calorie alternatives provide new ideas for old favorites. When making a food choice, remember to consider vitamins and minerals. Some foods provide most of their calories from sugar and fat but give you few, if any, vitamins and minerals.

This guide is not intended to be a comprehensive catalog. The inclusion of the foods in the catalog is based on their fat and caloric content. Traditional Cypriot foods were included in the following catalog.

Avoid this	**Choose this**
Dairy Products	
Evaporated whole milk	Evaporated fat free (skim) or reduced fat (2%) milk
Whole milk	Low fat (1%), reduced fat (2%), or fat free (skim) milk
Ice cream	Sorbet, sherbet, low fat or fat free frozen yogurt, or ice milk (check label for calorie content)
Whipping cream	Imitation whipped cream (made with fat free [skim milk] or low fat vanilla yogurt
Cream cheese	'light" cream cheese or fat free cream cheese (5 %fat)
Cheese (cheddar, Swiss, jack)	Reduced calorie cheese, low calorie processed cheeses, etc. Fat free cheese (6% fat)
Regular (4%) cottage cheese	Low fat (1%) or reduced fat (2%) cottage cheese
Whole milk mozzarella cheese	Part skim milk, low-moisture mozzarella cheese
Whole milk ricotta cheese	Part skim milk ricotta cheese
Coffee cream (half and half) or nondairy creamer (liquid, powder)	Low fat (1%) or reduced fat (2%) milk or nonfat dry milk powder

Haloumi	Haloumi low in fat (less than 10% fat)
Anari	Low fat cheese (less than 12%) or low fat anari(8% fat) or low fat cottage cheese
Feta	Low fat cheese or low fat fetta (less than 12%)
Kefalotiri	Low fat cheese (less than 12%)
Cereal, Grains, and Pasta	
Pasta with white sauce (alfredo)	Wheat Pasta with red sauce (marinara)
Pasta with cheese sauce	Wheat Pasta with vegetables (primavera)
Cereal high sugar and chocolate	Bran flakes, crispy rice, oats etc. Cooked grits or oatmeal Whole grains (e.g., couscous, barley, bulgur, etc)
Meat, Fish, Sausage, and Poultry	
Cold cuts or lunch meats (bologna, salami)	Low fat cold cuts (95% to 97% fat free lunch meats, low fat pressed meats)
Hot dogs (regular)	Lower fat hot dogs
Bacon or sausage	Lean or turkeyham
Regular ground beef	Extra lean ground beef/pork such as ground round or ground turkey (read labels)
Chicken or turkey with skin, duck, or goose	Chicken or turkey without skin (white meat)
Oil-packed tuna	Water-packed tuna (rinse to reduce sodium content)
Beef (chuck, rib, brisket)	Beef (round, loin) (trimmed of external fat) (chose select grades)
Pork (spareribs, untrimmed loin)	Pork tenderloin or trimmed, lean smoked ham
Frozen breaded fish or fried fish (homemade or commercial)	Fish or shellfish, unbreaded (fresh, froze, canned in water)
Whole eggs	Egg whites or egg substitutes
Frozen TV dinners (containing more than 13 grams of fat per serving)	Frozen TV dinners (containing less than 13 grams of fat per serving and lower in sodium)
Sausage	Turkey sausage, drained well (read label)

	Vegetarian sausage (made with tofu)
Baked Goods	
Croissants, traditional Cypriot puffy pastry	Hard french rolls or soft 'brown 'n serve" rolls
Donuts, sweet rolls, muffins, or pastries	Muffins, bagels, reduced fat or fat free muffins, sesame soft rolls
Party crackers	Low fat crackers (choose lower in sodium) Saltine or soda crackers (choose lower in sodium)
Cake (plain and chocolate)	Cake (angel food, white, gingerbread)
Cookies	Reduced fat or fat free cookies (graham crackers, ginger snaps, fig bars) (compare calorie level)
Snacks and Sweets	
Nuts	Popcorn (air-popped or light microwave), fruits, vegetables
Ice cream, e.g., cones or bars	Frozen yogurt, frozen fruit, or chocolate pudding bars
Custards or puddings (made with whole milk)	Rice Puddings (made with skim milk) Use traditional Cypriot Sweets ('glika tou koutaliou"(cooked swwts/nuts with sugar))
Fats, Oils, and Salad Dressings	
Regular margarine or butter	Light-spread margarines, diet margarine or whipped butter, tub or squeeze bottle
Regular mayonnaise	Light or diet mayonnaise or mustard
Regular salad dressings	Reduced calorie or fat free salad dressings, lemon juice, or plain, herb-flavored, or wine vinegar
Butter or margarine on toast or bread	Jelly, jam, or honey on bread or toast
Oils, shortening, or lard	Nonstick cooking spray for stir-frying or sautéing As a substitute for oil or butter, use applesauce or prune in baked goods Use olive oil in salad and cooking due to the

	monounsaturated content
Miscellaneous	
Canned cream soups	Canned broth-based soups
Traditional Trahana Cypriot soup (cooked in chicken broth and with the use of full fat milk and halloumi)	Prepare with skim milk and low halloumi and cooked in vegetable broth
Canned beans	Canned baked beans in tomato sauce
Gravy (homemade with fat and /or milk	Gravy mixes made with water or homemade with the fat skimmed off and fat free milk included
Fudge sauce/praline	Chocolate syrup
Avocado on sandwiches	Cucumber slices or lettuce leaves
Legumes with fried onion sauce	Legumes boiled with tomato juice

Appendix D. Food Exchange List

The Food Exchange Diet Plan

Overview

The exchange diet was created by the American Diabetes Association and the American Dietetic Association (2003) so that people with diabetes have a uniform, healthy diet plan to help control their blood sugar. However, the exchange diet is nutritionally balanced and allows a wide variety of foods, so it can be used by anyone.

Definition

Foods are divided into basic groups, with each item in the group having a specific portion size and all of the items in one group having the same number of calories, fats, protein and carbohydrates. The food items are called "exchanges" because items within the same group can be exchanged with each other.

Starches, Fruits and Vegetables

One serving in the group of starches contains 80 calories, 15 grams (g) of carbohydrates, 3 g of protein and 1 g of fat. Beans, peas and lentils are starches, but they count as one starch plus one lean meat exchange. The serving sizes vary because of the variety of foods.

Each serving in the fruit group has 60 calories, 15 g of carbohydrates and no protein or fat. Vegetables provide 25 calories, 2 g of protein, 5 g of carbohydrates and no fat. Vegetable serving sizes are 1/2 cup cooked and 1 cup of raw vegetables. Salad greens are considered a free food that can be eaten any time.

Sweets and desserts are allowed as long as they are eaten with a meal so they don't cause blood sugar to spike.

Proteins and Fats

The milk category is subdivided according to the amount of fat (0 to 8 g) and calories (100 to 160). Otherwise, one serving has 12 g of carbohydrate and 8 g of protein.

Each serving in the meat category is about 30gr and provides 7 g of protein, but this group is also subdivided into lean (0 to 3 g of fat and 45 calories), medium-fat (4 to 7 g of fat and 75 calories) and high-fat (8 or more g of fat and 100 calories) proteins.The exchanges in the fat category contain 45 calories and 5 g of fat.

The Exchange List				
Groups/ Lists	**Carb.**	**Protein**	**Fat**	**Calories**
Carbohydrate Group Starch	15	3	1 or less	80
Fruit	15	___	___	60
Milk				
Skim	12	8	0-3	90
Low-fat	12	8	5	120
Whole	12	8	8	150
Other carbohydrates	15	Varies	varies	Varies
Vegetables	5	2	___	25
Meat and Substitute Group				
Very lean	___	7	0-1	35
Lean	___	7	3	55
Medium-fat	___	7	5	75
High-fat	___	7	8	100
Fat Group	___	___	5	45

How It Works

The eating plan for an exchange diet is based on the total number of calories a person is going to consume in a day and described in terms of the number of exchanges the person can eat from each group a day. As one example, a 2000 calorie a day diet may include 11 exchanges from the bread group, eight from meat, four from vegetables, three from fruits, four from fats and two from milk.

How Much Carbohydrate is needed						
Calorie level	**~ 1200**	**~1400**	**~1600**	**~1800**	**~2400**	**~2800**
Calorie range	**1200-1500**	**1300-1600**	**1400-1700**	**1600-1900**	**1800-2300**	**2200-2800**
Carbohydrate grams	**180**	**180**	**195**	**210**	**240**	**300**
Carbohydrate choices	**12**	**12**	**12-13**	**13-14**	**15-16**	**18-20**
Grains, beans, & starchy vegetables	**6**	**6**	**6**	**7**	**9**	**11**
Vegetables	**3**	**3**	**3**	**4**	**4**	**5**
Fruits	**3**	**3**	**3**	**3**	**3**	**4**
Milk	**2**	**2**	**2-3**	**2-3**	**2-3**	**2-3**
Meats	**2 (4oz)**	**2 (4oz)**	**2 (5oz)**	**2 (5oz)**	**2 (6oz)**	**3 (70z)**
Fats g/servings	**40/4**	**47/5**	**54/6**	**60/7**	**74/9**	**93/12**

Source: ADA & ADA 2003

Considerations

The goal is to maintain a consistent blood sugar level, so it's important to eat regular meals and to not save exchanges for a big splurge. One advantage of the exchange diet is that it allows you to choose the foods you prefer from each group. A disadvantage is that you must take the time to calculate exchanges for food choices that consist of more than one ingredient.

Benefits of the Exchange System

1. Read Before You Exchange

The Food Exchange Chart is a list of foods that can be exchanged within a food group to create meals that are helpful and safe for a diabetic diet. For example, the American Dietetic Association/American Diabetes Association exchange list consists of three different criteria for which foods should be equal: carbohydrate, protein and fat. Within each category is a listing of sample foods that can be exchanged for the equivalent caloric, protein and fat contents. These foods are broken up into six major categories: Starch, Meat, Vegetables, Fruit, Milk and Fat. For each food, the list notes the recommended serving size for equal exchange of foods, such as a serving of bread (1 slice) or dry cereal (3/4 cup). Typically, Diabetic Food Exchange Charts also provide serving sizes in US units and metric systems, as well as the caloric content for exchanged foods.

2. Create the Meals

The first step in understanding the Food Exchange Chart is to study the food groups and exchanges as a whole. An ideal meal or snack would consist of the categories carbohydrate, protein (meat) and fat. For example, any carbohydrate source can be chosen for a diabetic meal, but another option can be chosen for equal value at the next meal. By using the Food Exchange Chart, beginner eaters are able to divide their meals between healthful food groups, without extreme amounts of weighing, measuring, or counting. In the beginning, however, it is important to measure portion sizes according to those suggested on the chart, such as a cup of squash or 1/4 cup of canned fruit.

3. Be Wary of Choices

It is important to make the best choices possible within each category on the Food Exchange Chart. Diabetic WLCs have to keep their weight at a healthy moderate level and eat a well-rounded diet at all times. In this sense, choose richly colored fruits and vegetables first and foremost from the carbohydrates exchange list. Users should also try to choose lean, light meats from the protein list (versus dark, fatty varieties) and low-fat or skim dairy products (instead of whole milk). As with any diabetic diet, sweets and sugary foods are to be used sparingly, in diligent moderation.

Another aspect of the Exchange Chart is "free foods," which are any foods below 20 calories, like sugar-free gelatin, low-calorie sauces and diet sodas. Enjoy up to three servings of free foods per day, without having to add them into the total tally of daily dietary exchanges.

4. Exchange Means Variety

The variety of foods that can be exchanged within each food group in an Exchange Chart is a huge benefit. If choosing from the list of fruits you could chose 4 dried apricot rings, 1 small apple or 3 medium dates for equal value in the meal. Introducing variety into the diet prevents boredom or weight gain. Users can exchange and change foods while maintaining a flexible lifestyle and overall desired calorie and nutrient intake for the day.

Food Exchange List

Within each group, these foods can be exchanged for each other.

Vegetables contain 25 calories and 5 grams of carbohydrate. One serving equals:

1/2 cup	Cooked vegetables (carrots, broccoli, zucchini, cabbage, etc.)
1 cup	Raw vegetables or salad greens
1/2 cup	Vegetable juice

If you're hungry, eat more fresh or steamed vegetables.

Fat-Free and Very Lowfat Milk contains 90 calories per serving. One serving equals:

1 cup	Milk, fat-free or 1% fat
3/4 cup	Yogurt, plain non fat or low fat
1 cup	Yogurt, artificially sweetened

Very Lean Protein choices have 35 calories and 1 gram of fat per serving. One serving equals:

30gr	Turkey breast or chicken breast, skin removed
30gr	Fish fillet (flounder, sole, scrod, cod, etc.)
30gr	Canned tuna in water
30gr	Shellfish (clams, lobster, scallop, shrimp)
3/4 cup	Cottage cheese, non fat or low fat
2 each	Egg whites
1/4 cup	Egg substitute
30gr	Fat-free cheese
1/2 cup	Beans- cooked (black beans, kidney, chick peas or lentils): count as 1 starch/bread and 1 very lean protein

Fruits contain 15 grams of carbohydrate and 60 calories. One serving equals:

1 small	Apple, banana, orange, nectarine
1 medium	Fresh peach

1	Kiwi
½	Grapefruit
½	Mango
1 cup	Fresh berries (strawberries, raspberries or blueberries)
1 cup	Fresh melon cubes
1/8 th	Honeydew melon
4 ounces	Unsweetened Juice
4 teaspoons	Jelly or Jam

Lean Protein choices have 55 calories and 2-3 grams of fat per serving. One serving equals:

30gr	Chicken- dark meat, skin removed
30gr	Turkey- dark meat, skin removed
30gr	Salmon, Swordfish, herring
30gr	Lean beef (flank steak, London broil, tenderloin, roast beef)*
30gr	Veal, roast or lean chop*
30gr	Lamb, roast or lean chop*
30gr	Pork, tenderloin or fresh ham*
30gr	Low fat cheese (3 grams or less of fat per ounce)
30gr	Low fat luncheon meats (with 3 grams or less of fat per ounce)
1/4 cup	4.5% cottage cheese
2 medium	Sardines
* Limit to 1-2 times per week	

Medium Fat Proteins have 75 calories and 5 grams of fat per serving. One serving equals:

30gr	Beef (any prime cut), corned beef, ground beef **
30gr	Pork chop
1 each	Whole egg (medium) **
30gr	Mozzarella cheese
1/4 cup	Ricotta cheese
120grs	Tofu (note this is a Heart Healthy choice)
** choose these very infrequently	

Starches contain 15 grams of carbohydrate and 80 calories per serving. One serving equals:

1 slice	Bread (white, pumpernickel, whole wheat, rye)
2 slice	Reduced calorie or "lite" Bread
1/4 (30gr)	Bagel (varies)
½	English muffin
½	Hamburger bun
3/4 cup	Cold cereal
1/3 cup	Rice, brown or white- cooked
1/3 cup	Barley or couscous- cooked
1/3 cup	Legumes (dried beans, peas or lentils)- cooked
1/2 cup	Pasta- cooked
1/2 cup	Bulgar- cooked
1/2 cup	Corn, sweet potato or green peas
90gr	Baked sweet or white potato
28gr	Pretzels
3 cups	Popcorn, hot air popped or microwave (80% light)

Fats contain 45 calories and 5 grams of fat per serving. One serving equals:

1 teaspoon	Oil (vegetable, corn, canola, olive, etc.)
1 teaspoon	Butter
1 teaspoon	Stick margarine
1 teaspoon	Mayonnaise
1 Tablespoon	Reduced fat margarine or mayonnaise
1 Tablespoon	Salad dressing
1 Tablespoon	Cream cheese
2 Tablespoons	Lite cream cheese
1/8th	Avocado
8 large	Black olives
10 large	Stuffed green olives
1 slice	Bacon

Source: American Dietetic Association Exchange List 1995

Food Exchanges

Food Exchange	US Unit	Metric	Comments
Starches	80 Calories		15 g Carb., 3 g Protein, 1 g Fat
• bread	1 slice	1 slice	• Most starches are a good source of B vitamins • Choose whole grain foods such as 'all natural, 100% whole wheat' bread, pasta, tortillas, and brown rice, etc. for nutrients and fiber. • Combine beans (starch & meat) with grains (starch) for their complimentary proteins and fiber • Combine grains (starch) with milk (milk) or cheese (meat) to compliment proteins. • Add additional fat exchanges for starchy foods prepared with fat.
• breads, other	1 oz	30 g	
• tortilla	1 (6")	1 (15 cm)	
• crackers	4-6 (3/4 oz)	4-6 (20 g)	
• cooked cereals	1/2 cup	125 ml	
• dry cereals, unsweetened	3/4 cup	175 ml	
• dry cereals, sweetened	1/2 cup	125 ml	
• dry flour or grain	3 Tbsp	45 ml	
• pasta	1/2 cup	125 ml	
• rice	1/3 cup	80 ml	
• corn	1/2 cup	125 ml	
• popcorn	3 cups	720 ml	
• potato (small)	1 (3 oz)	1 (85 g)	
• potato, mashed	1/2 cup	125 ml	
• sweet potato	1/3 cup	80 ml	
• squash, winter	1 cup	250 ml	
• cooked beans, peas, lentils (add 1 meat exchange)	1/2 cup	125 ml	
Vegetables	25 Calories		5 g Carb., 2 g Protein
• raw vegetables	1 cup	250 ml	• Choose more dark green leafy and deep yellow vegetables such as spinach, broccoli, carrots, and
• cooked vegetables	1/2 cup	125 ml	
	1/2 cup	125 ml	

• tomato or vegetable juice			peppers.
Fruit	60 Calories		15 g Carb.
• fresh fruit • melon (cubes) • canned fruit • dried fruit • fruit juice	1 small 12 oz (1 cup) 1/2 cup 1/4 cup 1/2 cup	1 small 360 g (250 ml) 125 ml 60 ml 125 ml	• Choose whole fruits for fiber • Choose citrus fruits such as oranges, grapefruits, or tangerines
Meat & Substitutes	35-145 Calories		7 g Protein, 0-13 g Fat
• meat, poultry, fish • cheese • cottage cheese • egg • peanut butter • tofu • cooked beans, peas, lentils (add 1 starch)	1 oz 1 oz 1/4 cup 1 1.5 Tbsp 4 oz (1/2 cup) 1/2 cup	30 g 30 g 60 ml 1 22 ml 115 g (125 ml) 125 ml	• Choose leaner meats such as chicken, fish, and lean cuts of meat; add fat exchange for higher fat meats and substitutes. • Remove skin from poultry. • Limit frying or adding fat. • Have 2 servings of fish per week for Omega 3 fatty acid.
Milk	80-150 Calories		12 Carb., 8 g Protein, 0-8 g Fat
• milk • yogurt	1 cup 1 cup	250 ml 250 ml	• Choose lower fat milks; add fat exchange for higher fat milk.
Fat	45 Calories		5 g Fat

• oil • mayonnaise • cream cheese • salad dressing • peanuts • avocado • butter or margarine • higher fat exchange (additional)	1 tsp 1 tsp 1 Tbsp 1 Tbsp 10 1/8 1 tsp 1 exchange	5 ml 5 ml 15 ml 15 ml 10 1/8 5 ml 1 exchange	• Eat less saturated fat such as animal fat found in fatter meat, cheeses, butter, and tropical oils (e.g.: palm). Also eat less hydrogenated fat, or trans-fats. • Consume mono-unsaturated fat and moderate poly-unsaturated fat. • Check Nutrition Facts on food labels; 5 g Fat = 1 Fat exchange.
Sweets	Calories vary		15 g Carb., Protein & Fat varies
• ice cream • cookies • syrup • jam or jelly • sugar • pudding • muffin or cupcake	1/2 cup 2 small 1 Tbsp 1 Tbsp 2 Tbsp 1/4 cup 1/2 small	125 ml 2 small 15 ml 15 ml 30 ml 60 ml 1/2 small	• Choose sweets sparingly because they are high in sugar, saturated fats or trans fats. • Can be substituted for a 1 Starch, Fruit, or Milk exchange. • Add 1 or 2 Fat exchanges for sweets containing fat.

Source: American Dietetic Association Exchange List 1995

Sample Exchange List

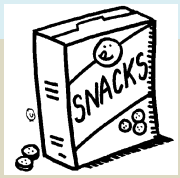
MENU FOR THE DAY

	Breakfast	Lunch	Dinner	Snack
1,200 calorie menu includes TOTAL EXCHANGES: 2 Milk 5 Starch/Bread 4 Fruit 5 Meat 2 Fat 2 Vegetable	1 milk exchange 1 starch/bread exchange 1 fruit exchange 1 meat exchange 1 fat exchange Free foods	1 starch/bread exchange 2 meat exchange 1 vegetable exchange Free foods	2 starch/bread exchanges 1 milk exchange 2 meat exchanges 1 fat exchange 1 vegetable exchange Free foods	1 starch/bread exchange 3 fruit exchanges Free foods
1,500 calorie menu ADD these additional exchanges to 1,200 menu: 1 Starch/Bread 1 Fruit 2 Vegetable		1 vegetable exchange	1 vegetable exchange	1 fruit exchange 1 starch/bread exchange
1,800 calorie menu ADD these additional exchanges to 1,500 menu: 1 Fruit 1 Meat 2 Fat	1 meat exchange	2 fat exchanges	1 fruit exchange	

This is a ***sample*** menu plan. That means that someone has choices. For example, a fruit can be moved from one meal to another. The point is to try to keep food balanced throughout the day, but an exchange can be moved from one meal to another, if desired. If you someone has special medical considerations, he/she should also experiment and customize the combination of exchanges to suit him/her. For the seriously ill, a clinical dietitian's advice may be needed. For example, one diabetic may be able to handle 6 fruits, a second person may not.

Appendix E. Menus with Lower Calories

Traditional menu – 1,200calories You can use the exchange list in Appendix E to give yourself more choices.				
Breakfast	**Calories**	**Fat (grams)**	**% Fat**	**Exchange for:**
Whole wheat bread, 1 medium slice	70	1.2	15	(1 bread/starch)
Jelly, regular, 2 tsp	30	0	0	(1/2 fruit)
Cereal, shredded wheat, 1/2 cup	104	1	4	(1 bread/starch)
Milk, 1%, 1 cup	102	3	23	(1 milk)
Orange juice, 3/4 cup	78	0	0	(1 1/2 fruit)
Coffee, regular, 1 cup 	5	0	0	(Free)
Breakfast total	**389**	**5.2**	**10**	
Lunch	**Calories**	**Fat (Grams)**	**% Fat**	**Exchange for:**
Roast beef sandwich: Whole wheat bread, 2 medium slices	139	2.4	15	(2 bread/starch)
Lean roast beef, unseasoned, 2 oz	60	1.5	23	(2 lean protein)
Lettuce, 1 leaf	1	0	0	
Tomato, 3 medium slices	10	0	0	(1 vegetable)
Mayonnaise, low calorie, 1 tsp	15	1.7	96	(1/3 fat)
Apple, 1 medium 	80	0	0	(1 fruit)
Water, 1 cup	0	0	0	(Free)
Lunch total	**305**	**5.6**	**16**	
Dinner	**Calories**	**Fat (Grams)**	**% Fat**	**Exchange for:**
Salmon, 2 ounces edible	103	5	44	(2 lean protein)
Vegetable oil, 1 1/2 tsp	60	7	100	(1 1/2 fat)
Baked potato, 3/4 medium	100	0	0	(1 bread/starch)

Margarine, 1 tsp	34	4	100	(1 fat)
Green beans, seasoned, with margarine, 1/2 cup	52	2	4	(1 vegetable) (1/2 fat)
Carrots, seasoned	35	0	0	(1 vegetable)
White dinner roll, 1 small	70	2	28	(1 bread/starch)
Iced tea, unsweetened, 1 cup 	0	0	0	(Free)
Water, 2 cups	0	0	0	(Free)
Dinner total	**454**	**20**	**39**	
Snack	**Calories**	**Fat (Grams)**	**% Fat**	**Exchange for:**
Popcorn, 2 1/2 cups 	69	0	0	(1 bread/starch)
Margarine, 3/4 tsp	30	3	100	(3/4 fat)
Total	**1,247**	**34–36**	**24–26**	

Calories.	1,247
Total carbohydrate, % kcals	58
Total fat, % kcals.	26
*Sodium, mg	1,043
Saturated fat, % kcals.	7
Cholesterol, mg	96
Protein, % kcals.	19

Note: Calories have been rounded.
1,200: 100% RDA met for all nutrients except vitamin E 80%, vitamin B2 96%, vitamin B6 94%, calcium 68%, iron 63%, and zinc 73%.
* No salt added in recipe preparation or as seasoning. Consume at least 1- 1.5 liter of water.

Lacto – Ovo Vegetarian Cuisine – Reduced Calories		
Breakfast	**1.600 calories**	**1.200 calories**
Orange	1 medium	1 medium
Pancakes, made with 1% lowfat milk and eggs whites	3 4” circles	2 4” circles
Pancake syrup	2 T	1 T
Margarine, diet	1 1/2 tsp	1 1/2 tsp
Milk, 1%, low fat	1 cup	1/2 cup
Coffee 	1 cup 1 cup	
Milk, 1%, low fat	30g	30g
Lunch		
Vegetable soup, canned, low sodium	1 cup	½ cup
Bagel	1 medium	½ medium
Processed American cheese, low fat	23g	-
Spinach salad:		
Spinach	1 cup	1 cup
Mushrooms 	½ cup	½ cup
Salad dressing, regular calorie	2tsp	2tsp
Apple	1 medium	1 medium
Iced tea, unsweetened	1 cup	1cup
Dinner		
Omelette:		
Egg whites	4 large eggs	4 large eggs
Green pepper	2 T	2 T
Onion	2 T	2 T
Mozzarella cheese, made from part skim milk,	30g	15g

low sodium		
Vegetable oil	1 T	1/2 T
Brown rice, seasoned with 1	½ cup 1	½ cup
Margarine, diet	1/2 tsp	1/2 tsp
Carrots, seasoned with	1/2 cup	1/2 cup
Margarine, diet	1/2 tsp	1/2 tsp
Whole wheat bread	1slice	1slice
Margarine, diet	1tsp	1tsp
Fig bar cookie	1bar	1bar
Tea	1 cup	1 cup
Honey	1 tsp	1 tsp
Milk, 1%, low fat	3/4 cup	3/4 cup

Calories 1,650	Calories 1,205
Total carbohydrate, % kcals . . .56	Total carbohydrate, % kcals . . .60
Total fat, % kcals 27	Total fat, % kcals 25
*Sodium, mg 1,829	*Sodium, mg 1,335
Saturated fat, % kcals 8	Saturated fat, % kcals 7
Cholesterol, mg 82	Cholesterol, mg 44
Protein, % kcals 19	Protein, % kcals 18

1,600:100% RDA met for all nutrients except vitamin E 92%, vitamin B_6 67%, iron 73%, and zinc 68%.
1,200: 100% RDA met for all nutrients except vitamin E 75%, vitamin B_1 92%, vitamin B_3 69%, vitamin B_6 59%, iron 54%, and zinc 46%.
* No salt added in recipe preparation or as seasoning. Consume at least 1-1.5 liter of water.

Appendix F. Cooking Can be Healthy and Tasty

Low Calorie, Lowfat Cooking/Serving Methods

Cooking low calorie, lowfat dishes may not take a long time, but best intentions can be lost with the addition of butter or other added fats at the table. It is important to learn how certain ingredients can add unwanted calories and fat to lowfat dishes— making them no longer lower in calories and lower in fat. The following list provides examples of lower fat cooking methods and tips on how to serve your lowfat dishes.

Lowfat Cooking Methods

These cooking methods tend to be lower in fat:

- Bake
- Broil
- Microwave
- Roast—for vegetables and/or chicken without skin
- Steam
- Lightly stir-fry or sauté in cooking spray, small amounts of vegetable oil, or reduced sodium broth
- Grill seafood, chicken, or vegetables

How to Save Calories and Fat

Look at the following examples for how to save calories and fat when preparing and serving foods. You might be surprised at how easy it is.

- Two tablespoons of butter on a baked potato adds an extra 200 calories and 22 grams of fat. However, 1/4 cup salsa adds only 18 calories and no fat.

- Two tablespoons of regular clear Italian salad dressing adds an extra 136 calories and 14 grams of fat.

Reduced fat Italian dressing adds only 30 calories and 2 grams of fat.

Try These Lowfat Flavorings—Added During Preparation or at the Table:

- Herbs—oregano, basil, cilantro, thyme, parsley, sage, or rosemary
- Spices—cinnamon, nutmeg, pepper, or paprika
- Reduced fat or fat free salad dressing
- Mustard
- Catsup
- Fat free mayonnaise
- Fat free or reduced fat sour cream
- Fat free or reduced fat yogurt
- Reduced sodium soy sauce
- Salsa
- Lemon or lime juice
- Vinegar
- Horseradish
- Fresh ginger
- Sprinkled buttered flavoring (not made with real butter)
- Red pepper flakes
- Sprinkle of parmesan cheese (stronger flavor than most cheese)
- Sodium free salt substitute
- Jelly or fruit preserves on toast or bagels

Appendix G. Dinning Out- Use of Food Plate Model

General Tips for Healthy Dining Out

Whether or not you're trying to lose weight, you can eat healthfully when dining out or bringing in food, if you know how. The following tips will help you move toward healthier eating as you limit your calories, as well as fat, saturated fat, cholesterol, and sodium, when eating out.

You Are the Customer

- Ask for what you want. Most restaurants will honor your requests.
- Ask questions. Don't be intimidated by the menu— your server will be able to tell you how foods are prepared or suggest substitutions on the menu.
- If you wish to reduce portion sizes, try ordering appetizers as your main meal.
- General tips: Limiting your calories and fat can be easy as long as you know what to order. Try asking these questions when you call ahead or before you order. Ask the restaurant, whether they would, on request, do the following:
  – Serve nonfat (skim) milk rather than whole milk or cream.
  – Reveal the type of cooking oil used.
  – Trim visible fat off poultry or meat.
  – Leave all butter, gravy, or sauces off a side dish or entree.
  – Serve salad dressing on the side.
  – Accommodate special requests if made in advance by telephone or in person.

Above all, don't get discouraged. There are usually several healthy choices to choose from at most restaurants.

Reading the Menu

- Choose lower calorie, lowfat cooking methods. Look for terms such as ‘steamed in its own juice” (au jus), ‘garden fresh,” ‘broiled,” ‘baked,” ‘roasted,” ‘poached,” ‘tomato juice,” ‘dry boiled” (in wine or lemon juice), or ‘lightly sautéed.”
- Be aware of foods high in calories, fat, and saturated fat. Watch out for terms such as ‘butter sauce,” ‘fried,” ‘crispy,” ‘creamed,” ‘in cream or cheese sauce,” ‘au gratin,” ‘au fromage,” ‘escalloped,” ‘parmesan,” ‘hollandaise,” ‘bearnaise,” ‘marinated (in oil),” ‘stewed,” ‘basted,” ‘sautéed,” ‘stir-fried,” ‘casserole,” ‘hash,” ‘prime,” ‘pot pie,” and ‘pastry crust.”

Specific Tips for Healthy Choices

Breakfast

- Fresh fruit or small glass of citrus juice
- Whole grain bread, bagel, or English muffin with jelly or honey
- Whole grain cereal with lowfat (1%) or nonfat milk
- Oatmeal with nonfat milk topped with fruit
- Omelet made with egg whites or egg substitute
- Multigrain pancakes without butter on top
- Nonfat yogurt (Try adding cereal or fresh fruit.)

Beverages

- Water with lemon
- Flavored sparkling water (noncaloric)
- Juice spritzer (half fruit juice and half sparkling water)
- Iced tea
- Tomato juice (reduced sodium)

Bread

Most bread and bread sticks are low in calories and low in fat. The calories add up when you add butter, margarine, or olive oil to the bread. Also, eating a lot of bread in addition to your meal will fill you up with extra unwanted calories and not leave enough room for fruits and vegetables.

Appetizers

- Steamed seafood
- Shrimp* cocktail (Limit cocktail sauce—it's high in sodium.)
- Melons or fresh fruit
- Bean soups
- Salad with reduced fat dressing (Or add lemon juice or vinegar.)

*** If you are on a cholesterol-lowering diet, eat shrimp and other shellfish in moderation.**

Entree

- Poultry, fish, shellfish, and vegetable dishes are healthy choices.
- Pasta with red sauce or with vegetables (primavera)
- Look for terms such as 'baked," 'broiled," 'steamed," 'poached," 'lightly sautéed," or 'stirfried."
- Ask for sauces and dressings on the side.
- Limit the amount of butter, margarine, and salt you use at the table.

Salads/Salad Bars

- Fresh greens, lettuce, and spinach
- Fresh vegetables—tomato, mushroom, carrots, cucumber, peppers, onion, radishes, and broccoli

- Beans, chickpeas, and kidney beans
- Skip the nonvegetable choices: deli meats, bacon, egg, cheese, croutons.
- Choose lower calorie, reduced fat, or fat free dressing, lemon juice, or vinegar.

Side Dish

- Vegetables and starches (rice, potato, noodles) make good additions to meals and can also be combined for a lower calorie alternative to higher calorie entrees
- Ask for side dishes without butter or margarine.
- Ask for mustard, salsa, or lowfat yogurt instead of sour cream or butter.

Dessert/Coffee

- Fresh fruit
- Nonfat frozen yogurt
- Sherbet or fruit sorbet (These are usually fat free, but check the calorie content.)
- Try sharing a dessert.
- Ask for lowfat milk for your coffee (instead of cream or half-and-half).

The Plate Method

This is one of the most basic methods to begin with when attempting to eat healthfully with diabetes. Basically, think of the plate divided into 3 sections. Fill half of the plate non-starchy vegetables, such as, broccoli, green beans, cabbage, zucchini, or cauliflower; fill ¼ of the plate with lean protein such as baked chicken, fish, or pork and fill the remaining ¼ of the plate with a healthy carbohydrate such as brown rice, sweet potato, or whole-wheat bread. One serving of fruit (1 small piece of fruit or 1 cup fresh fruit) and 1 cup skim milk or 240gr light yogurt can be also added. The picture below displays the plate method.

Source: ADA 2009

Note: If someone has a personalized meal plan, the number of servings per meal may be different.

Basic Carbohydrate Counting

Carbohydrates are the foods that break down into glucose (sugar) and have the greatest effect on raising blood glucose. Carbohydrates (carbs) do not have to be eliminated from the diet, but rather be consistent with the carbohydrate intake and avoid eating excessive amounts of carbs. Learning how to track the carbohydrates can be very helpful and it's often called 'carb counting." Carb containing foods are starches, such as bread and rice; fruit and fruit juice; and milk, yogurt, and sweet foods. The recommended carbohydrate intake varies depending on the height, weight, age, and activity level. Many women and men can eat between 2-4 Carbohydrate Choices at each meal and 1 Carbohydrate Choice per snack. See chart below for portion sizes for 1 Carbohydrate Choice. A Registered Dietitian can say exactly how many carbohydrates to eat at meals and snacks along with teaching how to read Food Labels. Reading food labels is very important when carb counting; check labels for grams of Total Carbohydrate per serving of food. One Carbohydrate Choice contains 15 grams Total Carbohydrate. This means if a food contains 30 grams of total carbohydrate per cup, this is about 2 Carbohydrate Choices.

One Carbohydrate Choice = 15 grams Total Carbohydrate

<u>One Carbohydrate Choice equals:</u>

1 slice bread ½ cup canned fruit in light syrup
1/3 cup pasta 1 cup skim or 1% milk
1/2 cup peas or corn 4-5 crackers
1/2 cup cooked cereal 15 pretzels
1/2 hamburger bun ½ English muffin
½ small bagel ½ small potato
1/3 cup rice ½ cup mashed potatoes
1 piece small fruit ½ cup sweet potatoes
1/2 banana 3 cups light popcorn
1 cup berries or melon ¾ cup unsweetened cereal
15 grapes or cherries ½ cup sugar-free pudding

Protein (meats, fish, poultry, and cheese) and fats (oil, margarine, mayonnaise, nuts, and salad dressings) are not carbohydrates; therefore they have minimal effect on blood glucose levels. Always try to choose lean protein choices such as chicken breast, fish, lean beef and pork, and reduced-fat cheese. Try to use reduced-fat and light fat products, such as, light mayonnaise and light salad dressing.

Free foods contain less than 5 grams of total carbohydrate per serving and have a minimal effect on blood sugar levels. Free foods include: diet soft drinks, coffee, tea, sugar-free Jell-o, and calorie-free flavored waters. The following foods are free up to 3 servings per day (spread throughout the day): 2 tsp. low-sugar jelly, 1 Tbsp, ketchup, 2 Tbsp. mustard, ¼ cup salsa, 2 Tbsp. sugar-free syrup, 1 sugar-free Popsicle stick.

Portion Control Using the Plate Method

Managing portion size is one of the best ways to control the eating habits and lose weight. That may require breaking some stubborn habits though. Most people are accustomed to filling up their plates based how hungry they feel. Here's how it works in three easy steps:

Step 1:

Take an average sized dinner plate and divide it in half. In one half place non-starchy vegetables such as:

- Spinach
- Broccoli
- Cauliflower
- Romaine lettuce
- Cabbage
- Carrots
- Tomatoes
- Onions
- Cucumber
- Beets
- Peppers

You can make a salad from a combination of these vegetable or just serve any one by itself. About one cup of raw vegetables is considered an appropriate serving size. One cup would be about the size of the fist.

Step 2:

Divide the other half of the plate in half again. In one quarter place the protein source, such as:

- 90gr. of lean beef or pork
- 90gr. of skinless turkey, chicken or fish
- Tofu
- Eggs

- Cottage cheese

A 90gr serving is about the size of a deck of cards.

Step 3:

In the other quarter of the plate place the starchy foods such as:

- Bread
- Potatoes
- Corn
- Beans
- Rice
- Tortilla
- Cereals
- Oatmeal

Serving sizes range from ½ cup of rice to a baked potato about the size of the fist.

The plate methods works best when you use a 9 inch plate versus the standard 12 inch dinner plate. While this method helps keeps portion control in check it is best used when you are away from home and can't measure the food carefully. It's also important to keep in mind that the amount of carbohydrates can vary widely in the same quantity of food. For example, a slice of bread may range between 7 to 30 grams of carbohydrates, depending on the type. If you suspect that a particular food may be higher in carbohydrates, take a smaller portion and savor the food by eating slowly.

The plate method can work well but only if you don't cheat. Limit the meal to only those foods you put on the plate initially and resist the urge to go back for seconds.

Portion Control Tips When Eating Out

Have you noticed that the size of muffins, candy bars, and soft drinks has grown over the years?

How about portions of restaurant foods like pasta dishes, steaks, and french fries?

As food portion sizes grow, people tend to eat more than they need to stay healthy.

Managing weight involves more than just choosing a healthy variety of foods. It also calls for recognizing and controlling how much and how often you eat. These tips show you how to use serving sizes to help you eat just enough for you.

Portion control is the key to managing the food intake when eating out. For many people, eating out is an excuse to overeat. There are tips to propose for dinning out to your clients.

1. Think about portion control *before* you leave home.

We often overeat when dining out because we are overly hungry. Snack on a few veggies before you leave home to take the edge off the hunger. This will help you feel less hungry when you order the food and make better decisions about how much to eat.

2. Eat slowly and savor the food.

Modest portions can be even more satisfying than large portions because you really try to enjoy the food. Eating quickly almost always leads to overeating because you have consumed the food before the stomach registers a feeling of fullness.

3. Practice the plate method.

The plate method divides a small dinner plate into one half non-starchy vegetables (broccoli, cauliflower, green beans, etc.) and the other half divided between protein (lean meat or poultry, chicken, fish or meat substitutes) and starchy foods (rice, bread, pasta, potatoes, beans, corn, etc.). When you eat what is on the plate, you are finished.

4. Learn the serving sizes.

The recommended serving for raw vegetables is about one cup or the size of the fist. A single serving of meat is about 90gr, or about the size of a deck of cards. A single serving of cooked pasta is one cup or about the size of a tennis ball.

Hand Symbol	Equivalent	Foods	Calories
	**Fist** 1 cup	Rice, pasta Fruit Veggies	200 75 40
	**Palm** 3 ounces	Meat Fish Poultry	160 160 160
	**Handful** 1 ounce	Nuts Raisins	170 85
	**2 Handfuls** 1 ounce	Chips Popcorn Pretzels	150 120 100
	**Thumb** 1 ounce	Peanut butter Hard cheese	170 100
	**Thumb tip** 1 teaspoon	Cooking oil Mayonnaise, butter Sugar	40 35 15

5. Split the meal in half.

This is especially helpful when going to restaurants that offer big portions. Before you even take the first bite, divide the meal in half. Take it home for another meal or share it with a friend.

6. Avoid restaurants that offer family or buffet-style meals.

Do not tempt yourself with all-you-can-eat offers. Even unlimited trips to the salad bar can be hazardous to the blood sugar control.

7. Keep a food diary of what you eat when dining out (see Appendix K).

Writing down what you eat makes you much more aware of how much you are consuming and will act as a reference for keeping you in check for the next meal out.

Another way to track portions is to use a food diary. Writing down when, what, how much, where, and why you eat can help you be aware of the amount of food you are eating and the times you tend to eat too much. Through the diary, you can become aware of the times and reasons you eat too much, and try to make different choices in the future.

If you tend to eat when you are not hungry, try doing something else, like taking a break to walk or call a friend, instead of eating.

Tips:

Remember...The amount of calories you eat affects the weight and health. In addition to selecting a healthful variety of foods, look at the size of the portions you eat. Choosing nutritious foods and keeping portion sizes sensible may help you reach and stay at a healthy weight.

8. Larger Food Portions Have More Calories

Lack of exercise and/or eating more calories than you need may lead to weight gain. Too much weight can put you at risk for:

- arthritis
- osteoporosis
- type 2 diabetes
- hypertension
- heart disease
- some types of cancers

Managing the weight calls for more than just choosing a healthful variety of foods like vegetables, fruits, grains, beans, and low-fat meat, poultry, and dairy products. It also calls for looking at **how much** and **how often** you eat.

9. What's The Difference between Portions and Servings?

A "portion" is how much food you choose to eat, whether in a restaurant, from a package, or in the own kitchen. A "serving" is a standard amount set by the U.S. Government, or sometimes by others for recipes, cookbooks, or diet plans. In this protocol for health professionals the Food and Drug Administration (FDA) Nutrition Facts Label standard for serving sizes is recommended**.**

What Is The Food and Drug Administration (FDA) Nutrition Facts Label?

The Food and Drug Administration (FDA) Nutrition Facts Label is printed on most packaged foods. It tells you how many calories and how much fat, carbohydrate, sodium, and other nutrients are in one serving of the food. The serving size is based on the amount of food people say they usually eat in one sitting. This size is often different than the serving sizes in the Food Guide Pyramid.

10. How Do I Know How Big My Portions Are?

The portion size that you are used to eating may be equal to two or more standard servings.

To see how many servings a package contains, check "servings per container" listed on the Nutrition Facts label. Small containers often have more than one serving. For example: A label for cookies may show serving size as two cookies, but if you eat four, you are eating twice the servings and double the calories, fat, and other nutrients in a standard serving.

11. Recognizing Standard Servings

Learning to recognize standard serving sizes can help you judge how much you are eating. When cooking for them, use measuring cups and spoons to measure the usual food portions and compare them to standard serving sizes from Nutrition Facts labels for a week or so. Put the measured food on a plate before you start eating. This will help you see what one standard serving of a food looks like compared to how much you normally eat.

12. What about Foods without a Nutrition Facts Label?

For foods that don't have a Nutrition Facts label, such as ground beef, use a kitchen scale to measure the food in grams (according to the Food Guide Pyramid, one serving of meat, chicken, turkey, or fish is 60-90gr).

Note: You do not need to measure and count everything you eat for the rest of the life - just long enough to recognize standard serving sizes.

13. Try These Other Ideas To Help You Control Portions At Home:

a. Take a standard serving out of the package and eat it off a plate instead of eating straight out of a box or bag.
b. Avoid eating in front of the TV or while busy with other activities.
c. Eat breakfast every day.

d. Pay attention to what you are eating and fully enjoy the smell and taste of the foods.
e. Eat slowly so the brain can get the message that the stomach is full.
f. Take seconds of vegetables or salads instead of meats or desserts.
g. Try to eat three sensible meals at regular times throughout the day.
h. Skipping meals may lead you to eat larger portions at the next meal.
i. When cooking in large batches, freeze food in single-meal-sized containers that you will not serve right away. This way, you won't be tempted to finish eating the whole batch before the food goes bad. And you'll have ready-made food for another day.
j. Keep snacking to a minimum.
k. When you do have a "treat", eat only one serving, eat it slowly, and enjoy it!

14. How Can I Control Portions When Eating Out?

Research shows that the more often a person eats out, the more body fat he or she has. Try to prepare more meals at home. Eat out and get take-out foods less often. When you do eat away from home, try these tips to help you control portions:

a. Share the meal, order a half-portion, or order an appetizer as a main meal.
b. Stop eating when you begin to feel full. Focus on enjoying the setting and the friends or family for the rest of the meal.

15.

a. Take half or more of the meal home. You can even ask for the half-meal to be boxed up before you begin eating so you will not be tempted to eat more than you need.
b. Avoid large beverages, such as "supersize" soft drinks. They have a large number of calories. Order the small size, choose a calorie-free beverage, or drink water with a slice of lemon.
c. If you stop at a fast food restaurant, choose one that serves salads, or order the small burger with lettuce and tomato.

16.

a. Have water or nonfat milk with the meal instead of a soft drink. If you want french fries, order the small size.
b. When traveling, bring along nutritious foods that will not spoil such as fresh fruit, small cans of fruit, peanut butter and jelly (spread both thin) sandwiches, whole grain crackers, carrot sticks, air-popped popcorn, and bottled water.

17. Supersize It

Have you noticed that it only costs a few cents more to get a larger size of fries or drinks? Getting a larger portion of food for just a little extra money may seem like a good value, but you end up with more food and calories than you need.

Before you buy the next value combo, be sure you are making the best choice for the health and the wallet. If you are with someone else, share the large-size meal. If you are eating alone, skip the special deal and just order what you need.

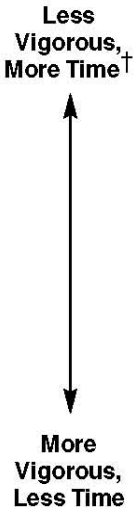
Appendix H. The Physical Activity Guidelines

An increase in physical activity is an important part of your weight management program. Most weight loss occurs because of decreased caloric intake. Sustained physical activity is most helpful in the prevention of weight regain. In addition, physical activity helps to reduce cardiovascular and diabetes risks beyond what weight reduction alone can do. Start exercising slowly and gradually increases the intensity. Trying too hard at first can lead to injury.

Your exercise can be done all at one time or intermittently over the course of the day. Initial activities may be walking or swimming at a slow pace. You can start by walking slowly for 30 minutes 3 days a week. Then build to 45 minutes of more intense walking at least 5 days a week. With this regimen, you can burn 100 to 200 calories per day. All adults should set a long-term goal to accumulate at least 30 minutes or more of moderate-intensity physical activity on most, and preferably all, days of the week. This regimen can be adapted to other forms of physical activity, but walking is particularly attractive because of its safety and accessibility. Also, try to change everyday activities; for example, take the stairs instead of the elevator. Reducing sedentary time is a good strategy to increase activity by undertaking frequent, less strenuous activities (Marcus 1995). With time, you may be able to—and you may want to—engage in more strenuous activities. Competitive sports such as tennis and volleyball can provide an enjoyable form of exercise, but you must take care to avoid injury.

Examples of Moderate Amounts of Physical Activity*

Common Chores	Sporting Activities
Washing and waxing a car for 45–60 minutes	Playing volleyball for 45–60 minutes
Washing windows or floors for 45–60 minutes	Playing touch football for 45 minutes
Gardening for 30–45 minutes	Walking 1¾ miles in 35 minutes (20 min/mile)
Wheeling self in wheelchair for 30–40 minutes	Basketball (shooting baskets) for 30 minutes
Pushing a stroller 1½ miles in 30 minutes	Bicycling 5 miles in 30 minutes
Raking leaves for 30 minutes	Dancing fast (social) for 30 minutes
Walking 2 miles in 30 minutes (15 min/mile)	Water aerobics for 30 minutes
Shoveling snow for 15 minutes	Swimming laps for 20 minutes
Stairwalking for 15 minutes	Basketball (playing a game) for 15–20 minutes
	Jumping rope for 15 minutes
	Running 1½ miles in 15 minutes (15 min/mile)



* A moderate amount of physical activity is roughly equivalent to physical activity that uses approximately 150 calories of energy per day, or 1,000 calories per week.

† Some activities can be performed at various intensities; the suggested durations correspond to expected intensity of effort.

Source: NHLBI 2001-2003

Barriers to fitness: Overcoming common problems

If you don't include physical activity in your daily routine, what's stopping you? Consider common barriers to fitness — and practical strategies for keeping your exercise program on track. The Mayo Clinic (2009) developed a list of *Barriers to Fitness* which they were modified and elaborated based on the results of the current study.

Barrier to Fitness

Sticking to a regular exercise schedule isn't easy. After all, there are plenty of potential hindrances — time, boredom, injuries, self-confidence. But these issues don't need to stand in your way. Consider practical strategies for overcoming common barriers to fitness.
Barrier 1: I don't have enough time to exercise
Setting aside time to exercise can be a challenge. Use a little creativity to get the most out of your time.
Squeeze in a few 10-minute walks throughout the day. If you don't have time for a full workout, don't sweat it. Shorter spurts of exercise spaced throughout the day offer benefits, too.
Get up earlier. If your days are packed and the evening hours are just as hectic, get up 30 minutes earlier twice a week to exercise. Once you've adjusted to early-morning workouts, add another day or two to the routine.
Claim the back row of the parking lot as your own. Or park a few blocks away and walk quickly to your destination.
Rethink your rituals. Your weekly Saturday matinee with the kids or your best friend could be reborn as your weekly Saturday bike ride, rock-climbing lesson or trip to the pool.
Barrier 2: Exercise is boring
It's natural to grow weary of a repetitive workout day after day, especially when you're going it alone. But exercise doesn't have to be boring.
Think of it as an activity. If you choose activities you enjoy, you're more likely to stay interested.

Remember, anything that gets you moving counts.
Vary the routine. Rotate among several activities — such as walking, swimming and cycling — to keep you on your toes while conditioning different muscle groups.
Join forces with friends, relatives, neighbors or co-workers. Enjoy the camaraderie, and offer encouragement to one another when the going gets tough.
Check out exercise classes or sports leagues at a recreation center or health club. Learn new skills while getting a great workout.
Barrier 3: I'm self-conscious about how I look when I exercise
Don't get down on yourself! Remind yourself what a great favor you're doing for your cardiovascular health, or focus on how much stronger you feel after a workout. Praise yourself for improving your stamina and making a commitment to lifelong fitness.
If you're still uncomfortable exercising in the presence of others, go solo at first. Try an exercise video or an activity-oriented video game. Consider investing in a stationary bicycle, treadmill, stair-climbing machine or other piece of home exercise equipment. As you become healthier and more at ease with exercising, your self-confidence is likely to improve as well.
Barrier 4: I'm too tired to exercise after working all day
No energy to exercise? Without exercise, you'll have no energy. It's a vicious cycle. But breaking the cycle with physical activity is one of the best gifts you can give yourself.
Try a morning dose of exercise. Remember the suggestion to get up 30 minutes earlier to exercise? Hop on the treadmill or stationary bicycle while you listen to the radio or watch the morning news. Or step outside for a brisk walk.
Make lunchtime count. Keep a pair of walking shoes at your desk, and take a brisk walk during your lunch break.
Be prepared. Put workout clothes on top of your dresser, socks and all. Keep a full water bottle in the fridge. Have an exercise video queued up and ready to go when you get home at night.

Hit the hay earlier. Running on empty is no way to face a full day. Go to bed earlier to make sure you're getting enough sleep.
Barrier 5: I'm too lazy to exercise
If the mere thought of a morning jog makes you tired, try these thoughts on for size:
Set realistic expectations. If your mental bar is too high, you might give up without even trying. Start with a walk around the block. Don't give up if you feel worn out. Take another walk around the block tomorrow. Keep it up, and eventually you'll no longer feel worn out. That's progress!
Work with your nature, not against it. Plan physical activity for times of the day when you tend to feel more energetic — or at least not quite so lazy.
Schedule exercise as you would schedule an important meeting or appointment. Block off times for physical activity, and make sure your friends and family are aware of your commitment. Ask for their encouragement and support.
Barrier 6: I'm not athletic
Natural athletic ability isn't a prerequisite to physical activity. Try something simple, such as a daily walk. Better yet, team up with friends who are in the same boat. Have fun while helping each other work out. Don't worry about becoming a superstar athlete or joining the hard-bodied athletes at the fitness club. Simply focus on the positive changes you're making to your body and mind.
Barrier: I've tried to exercise in the past and failed
Don't throw in the towel! You can't see it when you lower your cholesterol or reduce your risk of diabetes, but that doesn't mean you aren't doing yourself a great favor. Re-evaluate what went wrong, and learn from your mistakes.
Pace yourself. Start small and build up to more-intense workouts later, when your body is ready.
Set realistic goals. Don't promise yourself you're going to work out for an hour every day, and then get down on yourself when you fall short. Stick with goals you can more easily achieve, such as exercising

20 minutes a day, three days a week for the first month.
Remember why you're exercising. Use your personal fitness goals as motivation — and reward yourself as you meet your goals.
Barrier 7: I can't afford to buy expensive equipment or join a health club
You don't need a membership at an elite gym to get a great workout. Consider common-sense alternatives.
Do strengthening exercises at home. Use inexpensive resistance bands — lengths of elastic tubing that come in varying strengths — in place of weights. Lift plastic milk jugs partially filled with water or sand. Do push-ups or squats using your body weight.
Watch an exercise video. Try videos on dance aerobics, cardio-kickboxing, yoga or tai chi. For variety, trade exercise videos or games with a friend.
Start a walking group. Round up friends, neighbors or co-workers for regular group walks. Plan routes through your neighborhood or near your workplace, along local parks and trails, or in a nearby shopping mall.
Take the stairs. Skip the elevator when you can. Better yet, make climbing stairs a workout in itself.
Try your community center. Exercise classes offered through a local recreation department or community education group might fit your budget better than an annual gym membership.
Barrier 8: I'm afraid I'll hurt myself if I exercise
If you're nervous about injuring yourself, start off on the right foot.
Take it slow. Start with a simple walking program. As you become more confident in your abilities, add new activities to your routine.
Try an exercise class for beginners. You'll learn the basics by starting from scratch.
Consider working one-on-one with a personal trainer. Get a customized fitness tutorial from a

certified expert, who can monitor your movements and point you in the right direction.
Barrier: My family and friends don't support my efforts to exercise regularly
Remind those close to you of the benefits of regular exercise — and then bring them along for the ride!
Get your kicks with your kids. Sign up for a parent-child exercise class. Pack a picnic lunch and take your family to the park for a game of tag or kickball. Splash with the kids in the pool instead of watching from your chair.
Propose a new adventure. Instead of suggesting a workout at the gym, invite a friend to go to an indoor climbing wall or rent a tandem bicycle for the weekend.
Do double duty. Volunteer to drive your teens to the mall, and then walk laps inside while you wait for the shoppers. Try the same trick at your child's school during lessons, practices or rehearsals.
If necessary, have a heart-to-heart with your loved ones. If they don't share your fitness ambitions, ask them to at least respect your will to get fit.

Gaining Health Benefits From Physical Activity

It is much easier to control your weight when you are active, and being active helps to prevent osteoporosis (bone loss) and heart disease and helps in the treatment of diabetes. In addition, physical activity helps to increase your confidence and decrease your stress. It can also decrease sadness and improve depression.

Benefits of Regular Activity
• Control your weight better. • Physical activity can be lots of fun. • Exercise improves your mood • You can be with other people when you are active. • You'll feel better when you're physically active. • You'll look better when you're physically active. • Physical activity is good for your heart. • You'll feel more confident when you are active. • You'll have more energy. • Exercise promotes better sleep.

Fitting Activity into Your Schedule

• What time of day is best for you to exercise?

Try walking before going to work or school, or maybe you prefer evenings. Even a few minutes of walking counts. Try to build up to accumulating 30 minutes per day. You can walk whenever it is convenient for you, or you can take an aerobics class instead. Whatever works for you is fine. The important thing is that you try to be more active. There is no one right time of day to exercise.

Try to think about the little things you can do to add more activity to your daily life. For instance, take the stairs instead of the elevator at work, park farther away from the entrance to the mall, or walk instead of driving to work or to shopping. These little things add up and are easy to fit into your schedule.

Some people want to be alone when they exercise, whereas others prefer the company of a group or class.

Again, whatever works for you is fine.

- **What activities have you enjoyed in the past? Why did you stop? How can you start them again?**
  You may enjoy other activities that are better suited to your current lifestyle. The key is to find one or two you really like. Consider varying your activity to prevent boredom.

You can have fun and feel healthier by doing any of the following:
• Walk or ride a bike in your neighborhood. • Join a walking club at a mall or at work. • Play golf at a local club. • Join a dance class. • Work in your garden. • Use local athletic facilities. • Join a hiking or biking club. • Join a softball team or other sports team with coworkers, friends, or family. • Chase your kids in the park. If you don't have kids, take your neighbor's. The parents will appreciate the break, the neighbors will enjoy it, and you'll benefit from getting more activity. • Walk your dog. If you don't have a dog, pretend you do. Take a walk during your lunch break.

Planning To Become More Active

- **Begin slowly.**

If you have not been active for years, do not start with a 3-mile walk! Pushing yourself too hard or too fast will make you sore and discouraged.

- **Set realistic goals, and plan to succeed.**

For example, set the goal of walking two times this week. Even if you walk for only 5 minutes each time, you will have met your goal. Next week, you might try to walk two times for 10 minutes each time. Being

realistic helps you to feel good about yourself, and it helps you to keep up the good work. You may want to keep an activity log to track your progress.

• Reward yourself for reaching your goals.

Each time you meet an exercise goal; give yourself a treat to mark the occasion. Some ideas include the following: buy yourself new sports equipment, ask your spouse to take the kids for an hour, visit a friend, spend more time on your favorite hobby, buy yourself flowers or a plant, enjoy a long hot bath, or go to a movie or rent a video.

• Be active the healthy way.

Most healthy people can safely start a program of moderate activity. Talk to your doctor first if you have heart trouble or experience pain or pressure in your chest, neck, shoulder, or arm during or after exercise. Drink plenty of fluids while you are active. If the weather is bad, have a backup plan. Do your activity indoors. Use the proper equipment, such as a bicycle helmet for safety, and wear comfortable shoes or sneakers for walking.

• How hard should you exercise?

For the beginner in a sedentary lifestyle, activity level can be very light. This would include increasing standing activities, doing special chores like room painting, pushing a wheelchair, doing yard work, ironing, cooking, and playing a musical instrument.

The next level would be light activity such as slow walking (24 minutes per mile), garage work, carpentry, house cleaning, child care, golf, sailing, and recreational table tennis.

The next level would be moderate activity such as walking at 15 minutes per mile, weeding and hoeing a garden, carrying a load, cycling, skiing, tennis, and dancing.

Two Sample Activity Programs

There are many ways to begin an activity program. Below are two examples—a walking program and a jogging program. These activities are easy ways for most people to get regular exercise because they do not require special facilities or equipment other than good, comfortable shoes. If you find a particular week's pattern tiring, repeat it before going on to the next pattern. You do not have to complete the walking program in 12 weeks or the jogging program in 15 weeks.

A sample jogging program

If you are older than 40 and have not been active, you should not begin with a program as strenuous as jogging. Begin with the walking program instead. After completing the walking program, you can start with week 3 of the jogging program below.

If walking or jogging does not meet your needs, look for other exercise programs in pamphlets and books on aerobic exercise and sports medicine. Check out the programs and facilities of your local park and recreation department or community recreation centers. Many programs have adapted facilities for the disabled and for seniors.

A sample walking program

	Warmup	Exercising	Cool down	Total time
Week 1				
Session A	Walk 5 min.	Then walk briskly 5 min.	Then walk more slowly 5 min.	15 min.
Session B	Repeat above pattern			
Session C	Repeat above pattern			
Continue with at least three exercise sessions during each week of the program.				
Week 2	Walk 5 min.	Walk briskly 7 min.	Walk 5 min.	17 min.
Week 3	Walk 5 min.	Walk briskly 9 min.	Walk 5 min.	19 min.
Week 4	Walk 5 min.	Walk briskly 11 min.	Walk 5 min.	21 min.
Week 5	Walk 5 min.	Walk briskly 13 min.	Walk 5 min.	23 min.
Week 6	Walk 5 min.	Walk briskly 15 min.	Walk 5 min.	25 min.
Week 7	Walk 5 min.	Walk briskly 18 min.	Walk 5 min.	28 min.
Week 8	Walk 5 min.	Walk briskly 20 min.	Walk 5 min.	30 min.
Week 9	Walk 5 min.	Walk briskly 23 min.	Walk 5 min.	33 min.
Week 10	Walk 5 min.	Walk briskly 26 min.	Walk 5 min.	36 min.
Week 11	Walk 5 min.	Walk briskly 28 min.	Walk 5 min.	38 min.
Week 12	Walk 5 min.	Walk briskly 30 min.	Walk 5 min.	40 min.

Week 13 on:

Gradually increase your brisk walking time to 30 to 60 minutes, three or four times a week. Remember that your goal is to get the benefits you are seeking and enjoy your activity.

Walking Tips

- Hold your head up, and keep your back straight.
- Bend your elbows as you swing your arms.
- Take long, easy strides.

Source: NHLBI 2000

Appendix I. Behaviour Modification Guidelines for Eating and Exercise

Why Weight Is Important

Being overweight or obese can have a negative effect on your overall health. Overweight and obesity are risk factors for developing health problems such as high blood cholesterol, high blood pressure, diabetes, gallbladder disease, gynecologic disorders, arthritis, some types of cancer, and even some lung problems. People try to lose weight for a number of reasons. You may already have a health problem that you know about, such as high blood pressure, and want to lose weight to improve your health. Others may be losing weight in order to help prevent health problems. Still others simply want to lose weight to look thinner. For whatever reason, your health care provider may have given you information to help you lose weight.

In some ways, weight is different from other health problems since it is not something that is hidden, such as high blood cholesterol levels. WLCs may have had experience with health care providers who are insensitive about their weight. They may have had encounters where they felt blamed rather than helped. Please be assured that when your health care provider discusses your weight, it's because it is an important aspect of your overall health care. Your provider also understands that weight management is a long-term challenge influenced by behavioural, emotional, and physical factors.

How to Lose Weight and Maintain It

Set the Right Goals.

Setting the right goals is an important first step. Did you know that the amount of weight loss needed to improve health may be much less than you want to lose to look thinner? If your provider suggests an initial weight loss goal that seems too heavy for you, please understand that your health can be greatly improved by a loss of 5 percent to 10 percent of your starting weight. That doesn't mean you have to stop there, but it does mean that an initial goal of 5 to 10 percent of your starting weight is both realistic and valuable.

Most people who are trying to lose weight focus on one thing: weight loss. However, focusing on dietary and exercise changes that will lead to permanent weight loss is much more productive. People who are successful at managing their weight set only two to three goals at a time.

Effective goals are:

- specific
- realistic
- forgiving (less than perfect)

For example:

'Exercise more" is a fine goal, but it's not specific enough.

'Walk 5 miles every day" is specific and measurable, but is it achievable if you're just starting out?
'Walk 30 minutes every day" is more attainable, but what happens if you're held up at work one day and there's a thunderstorm during your walking time on another day?
'Walk 30 minutes, 5 days each week" is specific, achievable, and forgiving. *A great goal!*

Nothing Succeeds Like Success.

Shaping is a technique where you set some short-term goals that get you closer and to the ultimate goal (e.g., reduce fat from 40 percent of calories to 35 percent of calories, and ultimately to 30 percent). It is based on the concept that 'nothing succeeds like success."

Shaping uses two important behavioural principles:

- Continuous goals that move you ahead in small steps to reach a distant point.
- Continuous rewards to keep you motivated to make changes.

Reward Success (But Not With Food).

Rewards that you control can encourage achievement of your goals, especially ones that have been hard to reach. An effective reward is something that is desirable, timely, and dependent upon meeting your goal. The rewards you choose may be material (e.g., a movie, music CD, or payment toward buying a larger item) or an act of self-kindness (e.g., an afternoon off from work, a massage, or personal time). Frequent, small rewards earned for meeting smaller goals are more effective than bigger rewards, requiring a long, difficult effort.

Balance Your (Food) Checkbook.

Self-monitoring refers to observing and recording some aspect of your behaviour, such as calorie intake, servings of fruits and vegetables eaten, and amount of physical activity, etc., or an outcome of these behaviours, such as weight. Self-monitoring of a behaviour can be used at times when you're not sure of how you are doing and at times when you want the behaviour to improve. Self-monitoring of a behaviour usually moves you closer to the desired behaviour. When you record your behaviour, you produce real-time records for you and your health care provider to discuss. For example, keeping a record of your exercise can let you and your provider know quickly how you are doing. When your record shows that your exercise is increasing, you'll be encouraged to keep it up. Some WLCs find that standard self-monitoring forms make it easier, while others like their own recording system. Use the form in Appendix K to help you keep track of your daily diet and activity levels.

Regular monitoring of your weight is the key to keeping it off. Remember these four points if you are keeping a weight chart or graph:

- One day's diet and exercise routine won't necessarily affect your weight the next day. Your weight will change quite a bit over the course of a few days because of

fluctuations in water and body fat.

- Try to weigh yourself at a set time once or twice per week. This can be when you first wake up and before eating and drinking, after exercise, or right before dinner, etc.
- Whatever time you choose, just make sure it is always the same time and use the same scale to help you keep the most accurate records.
- It may also be helpful to create a graph of your weight as a visual reminder of how you're doing, rather than just listing numbers.

Avoid a Chain Reaction.

Stimulus (cue) control involves learning what social or environmental cues encourage undesired eating, and then changing those cues. For example, you may learn from your self-monitoring techniques or from sessions with your health care provider that you're more likely to overeat when watching TV, when treats are on display by the office coffee pot, or when around a certain friend. Ways to change the situation include:

- Separating the association of eating from the cue (Don't eat while watching television.)
- Avoiding or eliminating the cue (Leave the coffee room immediately after pouring coffee.)
- Changing the environment (Plan to meet this friend in a nonfood setting.)

In general, visible and reachable food items often lead to unplanned eating.

Get the (Fullness) Message.

Changing the way you eat can help you to eat less and not feel deprived.

- Eating slowly will help you to feel satisfied when you've eaten the right amount

of food for you. It takes 15 or more minutes for your brain to get the message you've been fed. Slowing the rate of eating can allow you to feel full sooner and, therefore, help you eat less.

- Eating lots of vegetables and fruit and also starting a meal with a broth-based soup can help you feel fuller.
- Using smaller plates helps to moderate portions so they don't appear too small.
- Drinking at least eight glasses of noncaloric beverages each day will help you to feel full, possibly eat less, and benefit you in other ways.
- Changing your eating schedule, or setting one, can be helpful, especially if you tend to skip or delay meals and overeat later.

Weight Loss: Behaviour Modification Techniques for Eatting Behaviour

1. Increase water intake. Give yourself a goal of 1 gallon per day. This aids in the feeling of being "full", as well as cleaning out your system. If you feel you're unable to start drinking large quantities right away, just be sure to start drinking more than you are now.

2. Never skip breakfast. Whether your food plan allows you cereal and toast or fruit and yogurt, make an effort to sit down at the table and consciously enjoy your breakfast.

3. Eat all of your meals and snacks at the same designated eating space and preferably the same time of day.

4. Before eating, record all food intakes. Note what is going on your plate before it goes in your mouth. You are less likely to misjudge your servings if you have them measured and written down first.

5. Eat your favorite foods first.

6. Know you're most vulnerable times for snacking and plan a defense before temptation strikes. Go for a walk, exercise; phone a friend or a diet buddy.

7. Get rid of clothes you no longer fit into. This keeps you from falling back into a "comfort zone", as you will immediately notice your new clothes feeling snug.

8. Give yourself a non-food reward for all of your accomplishments. Don't save your rewards just for reaching major goals, but reward yourself every time you pass up a cinnamon bun or walk right on by the vending machine. Take the money you would have spent on the candy bar and put it in a special "rewards" jar. As it adds up, get yourself special treats like a new bubble bath or cologne. Anything that makes you feels special.

9. Put your meals on smaller plates or in shallow bowls. If your food plan is rigid with portion sizes, this will especially make you feel as if you're eating more.

10. If you can't have it, don't have it around. In a perfect world this would be a simple thing, but for those of us with families to care for we often must encounter what we can't partake of.

    The answer to that is if you can't keep it out of the house, keep it under wraps. Put tempting foods in colored or paper bags and store them in the back of the cupboard. When preparing meals try to make only enough for others but none for you, if it's something you can't have. During meal times, keep serving dishes off the table and dispose of leftovers immediately.

PHYSICAL ACTIVITY PRESCRIPTION

Presenting recommendations as a "physical activity prescription" is a useful idea (Pate 1995). Writing a patient a prescription uses a medical model with which both health professionals and patients are familiar. It also reinforces the view to patients that physical activity is as important to their health as any medication that might be prescribed. Allowing the patient to take part in setting the physical activity goal will enhance obedience with the prescription. Adapting simple behavioural change concepts into counseling will help make the time available for counseling more effective.

For inactive or irregularly active adults who are interested in increasing their activity level, counseling should include an actual activity plan or physical activity prescription. Because these patients are ready to change, any counseling or direction provided is much more likely to interpret into a behaviour change. Focus should be placed on increasing moderate physical activity to between 30 and 60 minutes per day. This can be accomplished by accumulating several bouts of 10 to 15 minutes of activity. It is important to have the person/patient be as clear as possible regarding the plan, including type of activity and intensity, location, when he or she is going to be active, and the duration. In order to make the plan detailed, the person/adult will need to anticipate barriers and create solutions. The more detailed the plan, the more likely the person/adult is to meet his or her goal.

CREATING A SOCIAL ENVIRONMENT FOR PHYSICAL ACTIVITY

Physical activity needs to be fun and easy to get to for the individual if it is to be continued. It is vital to help the adult/patient choose an activity routine that is fun, developmentally appropriate, and realistic given his or her individual, family, and community resources. One method used frequently in exercise prescription for adults

incorporates the following: frequency, intensity, time (duration), and type of activity. This can be useful for creating a physical activity prescription, and it can be used as a simple way to document recommendations in the medical/dietitian's record.

Suggestions for increasing physical activity can contain walking or bicycling for transportation and planning physically active rather than sedentary activities with friends and family.

Identifying ways to fit in increased physical activity into the activities of daily living can also be useful. Examples include taking the stairs when possible, getting off the bus a stop earlier, taking walks with friends rather than talking on the telephone, and walking at least one lap of the mall before shopping.

Identifying a social support or physical activity partner has been identified as an important component in making a successful behaviour change. Adults should plan active times or vacations with their family and friends.

REINFORCEMENT

The behaviour of an adult/patient who is appropriately active should be reinforced. Often it is helpful to identify the health benefits of regular activity, such as maintenance of appropriate weight, increased energy, enhanced sense of well-being, and self-esteem. It can also be useful to assess how confident a patient is that he or she will remain active and to provide solutions for any identified potential barriers to maintaining that activity.

Health care providers such as dietitians need to be good role models for their patients and their families. This includes a personal plan for incorporating physical activity within their busy schedules. Studies with internists show that dietitians who are regular exercisers are more likely to provide more frequent and more aggressive physical activity counseling for their patients.

COMMUNITY AND SCHOOLS

Dietitians can play an important role in promoting physical activity by being good role models for an active lifestyle and being advocates for physical activity in other arenas. Children and adolescents spend most of their time attending school. Dietitians need to promote for more health education and physical education that includes aerobic lifestyle activities (i.e., walking, jogging, dancing), as well as teaching sport-specific skills. In addition, dietitians can become more involved with teachers and coaching staff. This communication improves the care of the young athlete and increases the effectiveness of dietitians, teachers, and coaching staffs.

Health care providers and dietitians are also important advocates for the accessibility of safe places for physical activity. This advocacy ranges from promoting the availability of open spaces, parks, recreation centers, and community centers to promoting the availability of schools and school playgrounds after hours.

Physical Activity in Your Life

At Home

It's suitable, comfortable and safe to work out at home. It allows your children to see you being active, which sets a good example for them. You can join exercise with other activities, such as watching TV. If you buy exercise equipment, it's a one-time expense and other family members can use it. It's easy to have short bouts of activity several times a day. Try these guidelines:

- Work in the garden or cut the grass. Collect leaves, dig and pick up trash.
- Go out for a short walk before breakfast, after dinner or both! Start with 5-10 minutes and work up to 30 minutes.
- Walk or bike to the store instead of driving.

- When walking, pick up the pace from leisurely to brisk. When watching TV, sit up instead of lying on the sofa. Better yet, spend a few minutes pedaling on your exercise bicycle while watching TV. Throw away your video remote control. Instead of asking someone to bring you a drink, get up off the couch and get it yourself.
- Do housework yourself instead of hiring someone else to do it
- Use a wire telephone in the house instead of a wireless.
- Walk with your dog.
- Park farther away at the shopping mall and walk the extra distance.
- Stretch to reach items in high places and squat or bend to look at items at floor level.
- Use your exercise equipment

At Work

Most of us have sedentary jobs. Work takes up a significant part of the day.

- Brainstorm project ideas with a co-worker while taking a walk.
- Stand while talking on the telephone.
- Walk down the hall to speak with someone rather than using the telephone.
- Take the stairs instead of the elevator. Or get off a few floors early and take the stairs the rest of the way.
- Walk while waiting for the plane at the airport.
- Stay at hotels with fitness centers or swimming pools and use them while on business trips.
- Take along a jump rope in your suitcase when you travel. Jump and do calisthenics in your hotel room.
- Participate in or start a recreation league at your company.
- Form a sports team to raise money for charity events.

- Join a fitness center near your job. Work out before or after work to avoid rush-hour traffic, or drop by for a noon workout.
- Schedule exercise time on your business calendar and treat it as any other important appointment.
- Get off the bus a few blocks early and walk the rest of the way to work or home.

- Walk around your building for a break during the work day or during lunch.

At Leisure time

Play and recreation are important for good health. Look for opportunities such as these to be active and have fun at the same time:

- Plan family outings and vacations that include physical activity (hiking, backpacking, swimming, etc.)
- See the sights in new cities by walking, jogging or bicycling.
- Meet with a friend to enjoy your favorite physical activities. Do them regularly.
- Play the music that you like while exercising, something that motivates you.
- Dance. Take dancing lessons. Hit the dance floor on fast numbers instead of slow ones.
- Join a recreational club that emphasizes physical activity.
- At the beach, sit and watch the waves instead of lying flat. Better yet, get up and walk or play rackets, volleyball and then swim.
- When golfing, walk instead of using a cart.
- Play singles tennis or racquetball instead of doubles.
- At the beach rent a rowboat instead of a canoe.

Health benefits of physical activity:

- Regular physical activity reduces the risk of many adverse health outcomes.
- Some physical activity is better than none.
- For most health outcomes, additional benefits occur as the amount of physical activity increases through higher intensity, greater frequency, and/or longer duration.
- Most health benefits occur with at least 150 minutes (2 hours and 30 minutes) a week of moderate intensity physical activity, such as brisk walking. Additional benefits occur with more physical activity.
- Both aerobic (endurance) and muscle-strengthening (resistance) physical activity are beneficial.
- Health benefits occur for children and adolescents, young and middle-aged adults, older adults, and those in every studied racial and ethnic group.
- The health benefits of physical activity occur for people with disabilities.
- The benefits of physical activity far outweigh the possibility of adverse outcomes.

Guidelines for Adults

- All adults should avoid inactivity. Some physical activity is better than none, and adults who participate in any amount of physical activity gain some health benefits.
- For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous intensity aerobic activity. Aerobic activity should be performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week.
- For additional and more extensive health benefits, adults should increase their aerobic physical activity to 300 minutes (5 hours) a week of moderate intensity, or

150 minutes a week of vigorous intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity activity. Additional health benefits are gained by engaging in physical activity beyond this amount.

- Adults should also do muscle-strengthening activities that are moderate or high intensity and involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.

Guidelines for Safe Physical Activity

To do physical activity safely and reduce the risk of injuries and other adverse events, people should:

- Understand the risks and yet be confident that physical activity is safe for almost everyone.
- Choose to do types of physical activity that are appropriate for their current fitness level and health goals, because some activities are safer than others.
- Increase physical activity gradually over time whenever more activity is necessary to meet guidelines or health goals. Inactive people should "start low and go slow" by slowly increasing how often and how long activities are done.
- Protect themselves by using suitable sports equipment, looking for safe environments, following rules and policies, and making wise choices about when, where, and how to be active.
- Be under the care of a health-care provider if they have chronic conditions or symptoms. People with chronic conditions and symptoms should check with their health-care provider about the types and amounts of activity suitable for them

Appendix J. Goal Setting and Recording for Weight Management

PATIENT _____

DATE	WEIGHT	WEIGHT CHANGE THIS VISIT	TOTAL WEIGHT CHANGE	WAIST	BMI	PATIENT GOALS SET THIS VISIT
						DIET PHYSICAL ACTIVITY BEHAVIOR NOTES
						DIET PHYSICAL ACTIVITY BEHAVIOR NOTES
						DIET PHYSICAL ACTIVITY BEHAVIOR NOTES
						DIET PHYSICAL ACTIVITY BEHAVIOR NOTES

Weight Management Chart

An important behaviour change is to keep a pictorial record of the weight, along with the physical activity habits. The instructions to the WLCBs are:

- Weigh yourself once a week and record each week's weight.
- Record each day's minutes of physical activity using the graph below, as shown in the example.
- Weigh yourself at the same time under the same conditions every week. The bottom horizontal lines show the days of the month. The vertical lines on the left side will show a range of the weights, while the vertical lines on the right side will show the minutes of physical activity. See below the sample chart.

Step 1: Personal Information

Gender	Male
Age	30
Height	178 cm
Starting weight	88 kg
Weight goal	77 kg
Daily activity level	Very active

Step 3: Activities

Date	Weight	Goal
07/04/2009	88	77
14/04/2009	86.7	77
21/04/2009	84.5	77
28/04/2009	84.3	77
04/05/2009	82.6	77
11/05/2009	81.4	77
18/05/2009	79.6	77
Most Recent Weight	80	

Source: O'Neil 2009

Weigh yourself at the same time under the same conditions every day. The bottom horizontal lines show the days of the month. The vertical lines on the left side will show a range of your weights, while the vertical lines on the right side will show the minutes of physical activity.

Chart Your Weight.

Write in your first weight on the third line from the top of the graph on the left side. List successive weights up and down from there, one kilogram per line. Each day go up the line above that day until you are on the same horizontal line as your weight that day, and mark the spot with a dot. Connect the dots with a solid line.

Chart Your Physical Activity.

Do the same for physical activity. Write in 5 minutes of physical activity on the first line from the bottom of the graph on the right side. List additional minutes of activity up from there using 5 minute intervals. Each day go up the line above that day until you are on the same horizontal line as your physical activity for that day, and mark the spot with a dot. Connect the dots with a solid line.

See Your Success.

The beginning of a weight loss program is when weight graphing is most fun—a good time to start the habit. Your graph will show ups and downs because of changes in fluid balance and differences in fluid intake from day to day. You will learn to understand these variations and use the overall trend to guide your weight control plan. Post the graph near your scale or on your refrigerator as a reminder of your progress.

Appendix K. Food and Physical Activity Diary

Why keep a diary?

Food diaries help you become more aware of your eating and activity habits, and problem areas. They give you a basis from which to plan changes and set goals, and allow you to look back and see what you've changed over time. This can be very motivating.

A food and activity diary will also encourage you to make conscious choices about what you eat and do - writing it down gives you the chance to think twice before you act. This is one of the most useful things you can do to help you gain control your weight.

Write down everything you eat and drink over the day.

You will be provided this form with a number of copies in order to keep them daily and return them to the researchers bi-weekly in order to assess them and discuss them with them. It's hard to remember what you've eaten at the end of the day, so try to record things as you go.

It can also help to make a note of any thoughts or feelings linked to eating, especially if you find you often eat for comfort or when you're not actually hungry.

Make a note, too, of any activity you do over the day that lasts for at least ten minutes.

Writing down everything you eat and drink can be difficult. The more honest you are, the more it will help you. It can take a little while to get used to and sometimes it may seem like a waste of time, but it's worth the effort.

If things are going well, you may find you only need to keep it now and then, or if your weight loss goes off track.

People who successfully lose weight and keep it off monitor what they eat and how active they are. This could be in the form of a diary, or in their head. It's a matter of finding out what works best for you.

Example of how to fill in your diary

Time	Food and drink	Where and who with	Thoughts
8am	Glass of orange juice	At home with family	Rushing to get everyone organised
9am	Chocolate muffin, large coffee	Coffee shop - alone	Stressed, need something sweet

Daily Food Diary

Keep a personal record of your food and activity habits daily and return to researchers bi-weekly

Day/Time	Food and drink	Activity and duration	Where and who with	Thoughts	Alternative Activities when binge/overeat

Time	Activity type		Where and who with	Duration	Alternative Activities when avoid exercise

Appendix L. Glycemic Index

In the past, carbohydrates were classified as simple or complex based on the number of simple sugars in the molecule. Carbohydrates composed of one or two simple sugars like fructose or sucrose (table sugar; a disaccharide composed of one molecule of glucose and one molecule of fructose) were labeled simple, while starchy foods were labeled complex because starch is composed of long chains of the simple sugar, glucose. Advice to eat less simple and more complex carbohydrates (i.e., polysaccharides) was based on the assumption that consuming starchy foods would lead to smaller increases in blood glucose than sugary foods (Liu et al 2002). This assumption turned out to be too simplistic since the blood glucose (glycemic) response to 'complex" carbohydrates has been found to vary considerably. A more accurate indicator of the relative glycemic response to dietary carbohydrates should be glycemic load, which incorporates the relative quality of carbohydrates characterized by glycemic index.

Measuring the Glycemic Index of Foods

To determine the glycemic index of a food, volunteers are typically given a test food that provides 50 grams of carbohydrate and a control food (white bread or pure glucose) that provides the same amount of carbohydrate on different days (Ludwig et al 2002). Blood samples for the determination of glucose are taken prior to eating and at regular intervals after eating over the next several hours. The changes in blood glucose over time are plotted as a curve. The glycemic index is calculated as the area under the glucose curve after the test food is eaten, divided by the corresponding area after the control food is eaten. The value is multiplied by 100 to represent a percentage of the control food. For example, a baked potato has a glycemic index of 76 relative to glucose and 108 relative to white bread, which means that the blood glucose response to the carbohydrate in a baked potato is 76% of the blood glucose response to the same amount of carbohydrate in pure glucose and 108% of the blood glucose response to the same amount of

carbohydrate in white bread (Fernandes et al 2005). In contrast, cooked brown rice has a glycemic index of 55 relative to glucose and 79 relative to white bread (Foster-Powell et al 2002). In the traditional system of classifying carbohydrates, both brown rice and potato would be classified as complex carbohydrates despite the difference in their effects on blood glucose levels.

Physiological Responses to High- versus Low-Glycemic Index Foods

By definition, the consumption of high-glycemic index foods results in higher and more rapid increases in blood glucose levels than the consumption of low-glycemic index foods. Rapid increases in blood glucose are potent signals to the beta-cells of the pancreas to increase insulin secretion (Ludwig et al 2002).

Over the next few hours, the high insulin levels induced by consumption of high-glycemic index foods may cause a sharp decrease in blood glucose levels (hypoglycemia). In contrast, the consumption of low-glycemic index foods results in lower but more sustained increases in blood glucose and lower insulin demands on pancreatic beta-cells (Willett 2001).

Glycemic Load

The glycemic index compares the potential of foods containing the same amount of carbohydrate to raise blood glucose. However, the amount of carbohydrate consumed also affects blood glucose levels and insulin responses. The glycemic load of a food is calculated by multiplying the glycemic index by the amount of carbohydrate in grams provided by a food and dividing the total by 100 (Liu et al 2002). . Dietary glycemic load is the sum of the glycemic loads for all foods consumed in the diet. The concept of glycemic load was developed by scientists to simultaneously describe the quality (glycemic index) and quantity of carbohydrate in a meal or diet.

Obesity

In the first two hours after a meal, blood glucose and insulin levels rise higher after a high-glycemic load meal than they do after a low-glycemic load meal containing equal calories. However, in response to the excess insulin secretion, blood glucose levels drop lower over the next few hours after a high-glycemic load meal than they do after a low-glycemic load meal. This may explain why 15 out of 16 published studies found that the consumption of low-glycemic index foods delayed the return of hunger, decreased subsequent food intake, and increased satiety (feeling full) when compared to high-glycemic index foods (Ludwig 2003). The results of several small, short-term trials (1-4 months) suggest that low-glycemic load diets result in significantly more weight or fat loss than high-glycemic load diets (21-23). Although long-term randomized controlled trials of low-glycemic load diets in the treatment of obesity are lacking, the results of short-term studies on appetite regulation and weight loss suggest that low glycemic-load diets may be useful in promoting long-term weight loss and decreasing the prevalence of obesity. A recent review of six randomized controlled trials concluded that overweight or obese individuals who followed a low-glycemic index/load diet experienced greater weight loss than individuals on a comparison diet that was either a high-glycemic index diet or an energy-restricted, low-fat diet (Thomas et al 2007). The length of the dietary interventions in these trials ranged from five weeks to six months.

HOW GLYCEMIC LOAD IMPROVES THE GLYCEMIC INDEX

Although most candy has a relatively high Glycemic Index, eating a single piece of candy will result in a relatively small glycemic response. Why? Well, simply because your body's glycemic response is dependent on both the type AND the amount of carbohydrate consumed. This concept, known as Glycemic Load, was first popularized in 1997 by Dr. Walter Willett and associates at the Harvard School of Public Health. Glycemic Load is calculated this way:

GL = GI/100 x Net Carbs

(Net Carbs are equal to the Total Carbohydrates minus Dietary Fiber)

Therefore, the glycemic response can be controlled by consuming low-GI foods and/or by restricting the intake of carbohydrates.

GLYCEMIC INDEX AND GLYCEMIC LOAD IN FOODS

GI and GL in Foods				
Food	**GI**	**Serving Size**	**Net Carbs**	**GL**
Peanuts	14	4 oz (113g)	15	2
Bean sprouts	25	1 cup (104g)	4	1
Grapefruit	25	1/2 large (166g)	11	3
Pizza	30	2 slices (260g)	42	13
Lowfat yogurt	33	1 cup (245g)	47	16
Apples	38	1 medium (138g)	16	6
Spaghetti	42	1 cup (140g)	38	16
Carrots	47	1 large (72g)	5	2
Oranges	48	1 medium (131g)	12	6
Bananas	52	1 large (136g)	27	14
Potato chips	54	4 oz (114g)	55	30

Snickers Bar	55	1 bar (113g)	64	35
Brown rice	55	1 cup (195g)	42	23
Honey	55	1 tbsp (21g)	17	9
Oatmeal	58	1 cup (234g)	21	12
Ice cream	61	1 cup (72g)	16	10
Macaroni and cheese	64	1 serving (166g)	47	30
Raisins	64	1 small box (43g)	32	20
White rice	64	1 cup (186g)	52	33
Sugar (sucrose)	68	1 tbsp (12g)	12	8
White bread	70	1 slice (30g)	14	10
Watermelon	72	1 cup (154g)	11	8
Popcorn	72	2 cups (16g)	10	7
Baked potato	85	1 medium (173g)	33	28
Glucose	100	(50g)	50	50

Source: Willet 2001

The table below shows values of the Glycemic Index (GI) and Glycemic Load (GL) for a few common foods. GI's of 55 or below are considered low and 70 or above are considered high. GL's of 10 or below are considered low and 20 or above are considered high.

LIMITATIONS OF THE GLYCEMIC INDEX AND THE GLYCEMIC LOAD

Some proponents of the Glycemic Index (including many diet books authors) would like you to believe that GI and GL are all that matters when selecting which foods to eat. In reality, diet is a more complex issue than that. ND agrees that the Glycemic Index is a marvelous tool for ranking carbohydrates (and much better than the old "simple" and "complex carbohydrate" designations). However, there are also many limitations to GI and GL, which are explained in this section. Consider this the warning that those diet book authors don't want you to hear...

1. **Scarcity of GI data**

   Although methods for determining Glycemic Index have been in existence for more than 20 years, GI values have so far only been determined for about 5% of the foods in ND's database. Seemingly similar foods can have very different GI values, so it's not always possible to estimate GI from either food type or composition. This means that each food has to be physically tested. GI testing requires human subjects, and is both relatively expensive and time-consuming. The fact that only a very limited number of researchers currently do GI testing compounds this problem. Food manufacturers continue to introduce thousands of new foods each year. Since GI testing is neither required nor common (at least in the U.S.), this problem is likely to get worse rather than better.

2. **Wide variation in GI measurements**

   The above Glycemic Index table shows a single value of GI for each food. In reality, though, the measurements are not so precise. Reported values are generally averages of several tests. There's nothing wrong with that methodology, but individual measurements can vary a significant amount. For example, baked Russet potatoes have been tested with a GI as low as 56 and as high as 111! The

GI for the same fruit has even been shown to increase as the fruit ripens. This amount of variation adds a great deal of uncertainty to GI calculations.

3. **GI values affected by preparation method**

The Glycemic Index gets even trickier when you take into account the changes in value that occur in response to differences in food preparation. Generally, any significant food processing, such as grinding or cooking, will elevate GI values for certain foods, because it makes those food quicker and easier to digest. This type of change is even seen with subtle alterations of the preparation, such as boiling pasta for 15 minutes instead of 10.

4. **GI values affected by combination with other foods**

While tests for Glycemic Index are usually done on individual foods, we often consume those foods in combination with other foods. The addition of other foods that contain fiber, protein, or fat will generally reduce the Glycemic Index of the meal. The GI of this "mixed meal" can be estimated by taking a weighted average of the GI's of the individual foods in the meal. However, this averaging method may become less accurate as the total percentage of carbohydrate decreases. Therefore, foods like pizza often create a higher glycemic response than the simple weighted average of the ingredient GI's would predict.

5. **Individual differences in glycemic response**

The rate at which different people digest carbohydrates also varies, so there are some individual differences in glycemic response from person to person. In addition it has been shown that one person's glycemic response may vary from one time of day to another. And finally, different people have different insulin responses (i.e. produce different levels of insulin), even with an identical glycemic response. This fact alone means that a diabetic can not rely completely

on the Glycemic Index without monitoring his own blood sugar response. (This, of course, is a limitation of any food index, and not a specific limitation of GI.)

6. **Reliance on GI and GL can lead to overconsumption**

   It's important to remember that the Glycemic Index is only a rating of a food's carbohydrate content. If you use GI and GL values as the sole factor for determining your diet, you can easily end up overconsuming fat and total Calories. See example below...

Example - How the Glycemic Index can encourage overeating:

Apples have a GI of 38 (as shown in the table above), and a medium-size apple, weighing 138 grams, contains 16 grams of net carbohydrates and provides a Glycemic Load of 6. This is a low GL, and most would consider the apple to be a very appropriate snack. But now look at peanuts. A 4-oz (120gr) serving not only weighs less than the apple, but has a much lower GI (Ford et al 2001).

14), and provides an even lower GL of 2. Based on Glycemic Load alone, you would have to believe that the peanuts were a better dietary choice than the apple. But if you take a look at the Calories contained in these two foods, you'll see that the apple contains approximately 72 Calories, while the peanuts contain more than 500! Those 400+ extra Calories are NOT going to help you lose weight.

Lowering Dietary Glycemic Load

Some strategies for lowering dietary glycemic load include:

• Increasing the consumption of whole grains, nuts, legumes, fruits, and nonstarchy vegetables

• Decreasing the consumption of starchy high-glycemic index foods like potatoes, white rice, and white bread

• Decreasing the consumption of sugary foods like cookies, cakes, candy, and soft-drinks

See the table below for the glycemic index and glycemic load values of selected foods (Foster-Powell et al 2002). Foods with higher glycemic index values are at the top of the table, while foods with lower glycemic index values are at the bottom of the table.

Glycemic Index and Glycemic Load Values for Selected Foods (Relative to Glucose)				
Food	**Glycemic Index (Glucose=100)**	**Serving size**	**Carbohydrate per serving (g)**	**Glycemic Load per serving**
Dates, dried	103	60g	40	42
Cornflakes	81	1 cup	26	21
Jelly beans	78	30g	28	22
Puffed rice cakes	78	3 cakes	21	17
Russet potato (baked)	76	1 medium	30	23
Doughnut	76	1 medium	23	17
Soda crackers	74	4 crackers	17	12

White bread	73	1 large slice	14	10
Table sugar (sucrose)	68	2 tsp	10	7
Pancake	67	6" diameter	58	39
White rice (boiled)	64	1 cup	36	23
Brown rice (boiled)	55	1 cup	33	18
Spaghetti, white; boiled 10-15 min	44	1 cup	40	18
Spaghetti, white; boiled 5 min	38	1 cup	40	15
Spaghetti, whole wheat; boiled	37	1 cup	37	14
Rye, pumpernickel bread	41	1 large slice	12	5
Oranges, raw	42	1 medium	11	5
Pears, raw	38	1 medium	11	4
Apples, raw	38	1 medium	15	6
All-Bran™ cereal	38	1 cup	23	9
Skim milk	32	240ml	13	4
Lentils, dried; boiled	29	1 cup	18	5
Kidney beans, dried; boiled	28	1 cup	25	7
Pearled barley; boiled	25	1 cup	42	11

Cashew nuts	22	30gr	9	2
Peanuts	14	30gr	6	1

Source: Harvard Health Publications 2000-2010

Appendix M. Equations and Tools for Behaviour Modification for Weight Management

Harris-Benedict equation

The **Harris-Benedict equation** (also called the **Harris-Benedict principle**) is a method used to estimate the daily calorie requirements of an individual using their basal metabolic rate or BMR.[1] The estimated value is then multiplied by a number that corresponds to the person's activity level. The resulting number is the recommended daily calorie intake to maintain current weight. The equation does not take into account calories burned by existing large amounts of muscle mass, nor does it account for the additional calories provided by excess body fat—so the equation is more effective for individuals at an ideal body weight or close to it[2]. The Harris Benedict equation may be used to assist weight loss—by reducing the calorie intake to a number below the outcome of the equation.

Step 1- calculating the BMR

The following table enables calculation of an individual's Basal Metabolic Rate (BMR).

BMR calculation for men	BMR = 66 + (13.7 x weight in kg) + (5 x height in cm) - (6.76 x age in years)
BMR calculation for men	BMR = 66 + (6.23 x weight in pounds) + (12.7 x height in inches) - (6.76 x age in years)
BMR calculation for women	BMR = 655 + (9.6 x weight in kg) + (1.8 x height in cm) - (4.7 x age in years)
BMR calculation for women	BMR = 655 + (4.35 x weight in pounds) + (4.7 x height in inches) - (4.7 x age in years)

Step 2 - applying the Harris-Benedict Principle

The following table enables calculation of an individual's recommended daily calorie intake to maintain current weight:

Little to no exercise	Daily calories needed= BMR x 1.2
Light exercise (1-3 days per week)	Daily calories needed= BMR x 1.375
Moderate exercise (3-5 days per week)	Daily calories needed= BMR x 1.55
Heavy exercise (6-7 days per week)	Daily calories needed= BMR x 1.725
Very heavy exercise (twice per day, extra heavy workouts)	Daily calories needed= BMR x 1.9

Source: Philippou and Andreou 2008

Ideal Body Weight

Background

An Ideal Body Weight (IBW) is one at which a person can experience optimal health and energy. Exceeding the ideal weight range increases the risk factors for certain diseases, especially if a person is 20 percent overweight. Ideal body weight (IBW) is the weight that people are expected to weigh based on gender, body frame type, age and height. The following equations are appropriate for adults.

The history of the formulas for calculating ideal body weight began in 1871 when Dr. Broca (a French surgeon) created the formula known as Broca's index. An unknown person translated Broca's formula into pounds and inches and modified it to create a formula called the simple rule. In 1974, Dr. Devine converted the simple rule from pounds to kilograms and published that formula for medical use. The Devine formula was intended for use to calculate the dosage of certain medications such as gentamicin, digoxin and theophylline. However, after its publication, the formula became much more widely used and became the most commonly used formula. In 1983, Dr. Robinson published a modification of the Devine formula; this contemporary modification is still in use today to calculate the dosage of most medications.

The ideal body weight calculator was discredited by all major medical institutions as a tool for measuring obesity and malnourishment in the last quarter of the 20thCentury. The tool did not account for the nutritional needs of WLCs, especially women, when it was devised. The Devine IBW formula suggests ideal body weight values that may be too low in women, and impossibly low in shorter women. A limitation of the Robinson and Miller formulas are that they give low calculations in taller men.

CHARTS AND CALCULATORS

Broca formula

Men: Ideal Body Weight (kilograms) = [Height (cm) - 100] - ([Height (cm) - 100] x 10%)

Women: Ideal Body Weight (kilograms) = [Height (cm) - 100] + ([Height (cm) - 100] x 15%)

Note: Broca's formula was translated into a simple conversion for pounds and inches which consists of allowing 100 lbs. for women or 110 lbs. for men for the first 5 feet and adding an additional 5 lbs. for every inch over 5 feet. This means a woman standing 5 feet 5 inches should weigh 125 lbs.

Devine formula

Men: Ideal Body Weight (kilograms) = 50 + 2.3kg per inch over 5 feet
Women: Ideal Body Weight (kilograms) = 45.5 + 2.3kg per inch over 5 feet

Hamwi formula

Men: Ideal Body Weight kilograms) = 48kg + 2.7kg for each inch over 5 feet
Women: Ideal Body Weight (in kilograms) = 45.5kg + 2.2kg for each inch over 5 feet

Miller formula

Men: Ideal Body Weight kilograms) = 56.2kg + 1.41kg for each inch over 5 feet
Women:Ideal Body Weight (kilograms) = 53.1kg + 1.36kg for each inch over 5 feet

Robinson formula

Men: Ideal Body Weight (kilograms) = 52kg + 1.9kg for each inch over 5 feet
Women: Ideal Body Weight (kilograms) = 49kg + 1.7kg for each inch over 5 feet

Lorenz Formula

The Lorenz formula was launched in 1929 and has two versions, one for males and the other for females. You need to know your height and weight before you apply it. Here is the equation:

Men: W(kg)= H(cm) – 100 -[H(cm) - 150]/4

Women: W(kg)= H(cm) – 100 -[H(cm) - 150]/2

New York metropolitan insurance company formula

This ideal body weight formula resulted from the ideal weight tables and charts dating from 1943-1983.

Men: W(kg)= 50 + 0.75 * [H(cm) - 150] + (A – 20) /4
Women: W(kg)= 50 + 0.75 * [H(cm) - 150] + (A – 20) /4

Simple rule

Men: Allow 110lbs for the first 5 feet and 5lbs for each additional inch.
Women: Allow 100lbs for the first 5 feet and 5lbs for each additional inch.

Other formulas

Men: Ideal Body Weight (kilograms) = 50kg + 2.3kg for each inch of height over 5 feet
Women: Ideal Body Weight (kilograms) = 45.5kg + 2.3kg for each inch of height over 5 feet

Note: 1 kilogram (kg) = 2.2 pounds (lb)

W(kg) – Your ideal body weight calculated in kilograms.
H(cm) – Your height measured in centimeters.
A – Your actual age.

1 Kilogram = 2.20 Pounds

1 lnch=2.54cm, 1 Feed=30.48cm, 1 Feet=12 Inch

Calculating body frame size (Vorvick 2008)

Body frame size is determined by a person's wrist circumference in relation to his height. For example, a man whose height is over 5' 5" and wrist is 6" would fall into the small-boned category. Determining frame size: To determine the body frame size, measure the wrist with a tape measure and use the following chart to determine whether the person is small, medium, or large boned.Women:Height under 5'2" Small = wrist size less than 5.5"Medium = wrist size 5.5" to 5.75"Large = wrist size over 5.75"Height 5'2" to 5' 5" Small = wrist size less than 6"Medium = wrist size 6" to 6.25"Large = wrist size over 6.25"Height over 5' 5" Small = wrist size less than 6.25"Medium = wrist size 6.25" to

6.5"Large = wrist size over 6.5"Men:Height over 5' 5" Small = wrist size 5.5" to 6.5"Medium = wrist size 6.5" to 7.5"Large = wrist size over 7.5"

Weight Loss using Body Frame

Another method of establishing how much weight loss you would benefit from in your diet and exercise plan is to use body size. Using this method, some people find that they don't need to lose as much weight as they first thought due to the size of their frame, others of course find that they are not in fact big boned and that they need to lose more weight than they had originally thought. Weight loss and weight loss plans are individual and the diets you choose should be tailored to your weight loss need.
To refine and define theoretical weights, researchers added frame size as a factor. The sizes are categorized into three groups: - Small frame, medium frame and large frame. The reason for this is that bone structures vary in size and density from person to person. Equally men and women have different structures. Bone mass and muscle mass all play a part in determining your optimal weight. There are two simple methods of determining frame size:

Measuring the circumference of the wrist. This is the easiest.
Measuring the breadth of your elbow. This is a bit more difficult but gives a wider range of results for accuracy.

Female Wrist Measurements			
	Height under 5' 2" (under 155cm)	Height 5' 2"-5' 5" (155cm - 163cm)	Height over 5' 5" (More than 163cm)
Small	Under 5.5" (140mm)	Less than 6.0" (152mm)	Less than 6.25" (159mm)
Medium	5.5" - 5.75" (140 - 146mm)	6" - 6.25" (152 - 159mm)	6.25" - 6.5" (159 - 165mm)
Large	over 5.75"(146mm)	over 6.25" (159mm)	over 6.5" (165mm)

Source: Halls Steven 2008

Male Wrist Measurements	
	Height over 5' 5" (over 163cms)
Small	5.5" - 6.5" (140 - 165mm)
Medium	6.5" - 7.5" (165 - 191mm)
Large	More than 7.5" (191mm)

Source: Halls Steven 2008

Female Elbow Measurements **Medium Frame**			
Height Ft and In	Elbow Breadth Inches	Height cms	Elbow Breadth mm
4' 10" - 4' 11"	21/4" - 21/2"	146 - 148	57 - 64
5' 0" - 5' 3"	21/4" - 21/2"	150 - 158	57 - 64
5' 4" - 5' 7"	23/8" - 25/8"	160 - 168	60 - 67
5' 8" - 5' 11"	23/8" - 25/8"	170 - 178	60 - 67
6' 0" - 6' 4"	21/2" - 23/4"	180 - 190	63 - 70

Source: Halls Steven 2008

Male Elbow Measurements **Medium Frame**			
Height Ft and In	Elbow Breadth Inches	Height cms	Elbow Breadth mm
5' 2" - 5' 3"	21/2" - 27/8"	155 - 158	64 - 73
5' 4" - 5' 7"	25/8" - 27/8"	160 - 168	67 - 73
5' 8" - 5' 11"	23/4" - 3"	170 - 178	70 - 75
6' 0" - 6' 3"	23/4" - 31/8"	180 - 188	70 - 79
6' 4" - 6' 7"	27/8" - 31/4"	190 - 198	73 - 83

Source: Halls Steven 2008

Following is the method the Metropolitan Life Insurance Company used to calculate frame size:

1. Extend your arm in front of your body bending your elbow at a ninety degree angle to your body so that your forearm is parallel to your body.
2. Keep your fingers straight and turn the inside of your wrist towards your body.
3. Place your thumb and index finger on the two prominent bones on either side of your elbow, then measure the distance between the bones with a tape measure or calipers.
4. Compare to the chart above. The chart lists elbow measurements for a medium frame - if your elbow measurement for that particular height is less than the number of inches listed, you are a small frame - if your elbow measurement for that particular height is more than the number of inches listed, your are a large frame.

The IPAQ instrument

The long, self-administered IPAQ covers four domains of physical activity: work-related, transportation, housework/gardening and leisure-time activity. The questionnaire also includes questions about time spent sitting as an indicator of sedentary behaviour. In each of the four domains the number of days per week and time per day spent in both moderate and vigorous activity are recorded. At work, during transportation and in leisure time, walking time is also included. Practical examples of culturally relevant activities of moderate and vigorous intensity are given. In this study, moderate intensity was defined as 3–6 MET (Metabolic Equivalent Task) and vigorous intensity was defined as more than 6 MET12. One MET is equal to energy expenditure during rest and is approximately equal to 3.5 ml O2 kg21 min21 in adults.

Outcome measures used were: (1) MET hours per week and (2) hours reported in moderate- and vigorous intensity activity per week. PA data from the questionnaire were transformed into energy expenditure estimates as MET using published values13, 14. To calculate the weekly physical activity (MET-h week21), the number of hours dedicated to each activity class was multiplied by the specific MET score for that activity7.

Continuous Score

Expressed as MET-min per week: MET level x minutes of activity/day x days per week

Sample Calculation

MET levels MET-minutes/week for 30 min/day, 5 days

Walking = 3.3 METs 3.3*30*5 = 495 MET-minutes/week

Moderate Intensity = 4.0 METs 4.0*30*5 = 600 MET-minutes/week

Vigorous Intensity = 8.0 METs 8.0*30*5 = 1,200 MET-minutes/week

_____

TOTAL = 2,295 MET-minutes/week

Total MET-minutes/week = Walk (METs*min*days) + Mod (METs*min*days) + Vig (METs*min*days)

Categorical Score- three levels of physical activity are proposed

1. Low

No activity is reported **OR**

a. Some activity is reported but not enough to meet Categories 2 or 3.

2. Moderate

Either of the following 3 criteria

a. 3 or more days of vigorous-intensity activity of at least 20 minutes per day **OR**

b. 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day **OR**

c. 5 or more days of any combination of walking, moderate-intensity or vigorous intensity

activities achieving a minimum of at least 600 MET-min/week.

3. High

Any one of the following 2 criteria

• Vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week **OR**

• 7 or more days of any combination of walking, moderate- or vigorous- intensity activities accumulating at least 3000 MET-minutes/week

Appendix N. Reference Tool to

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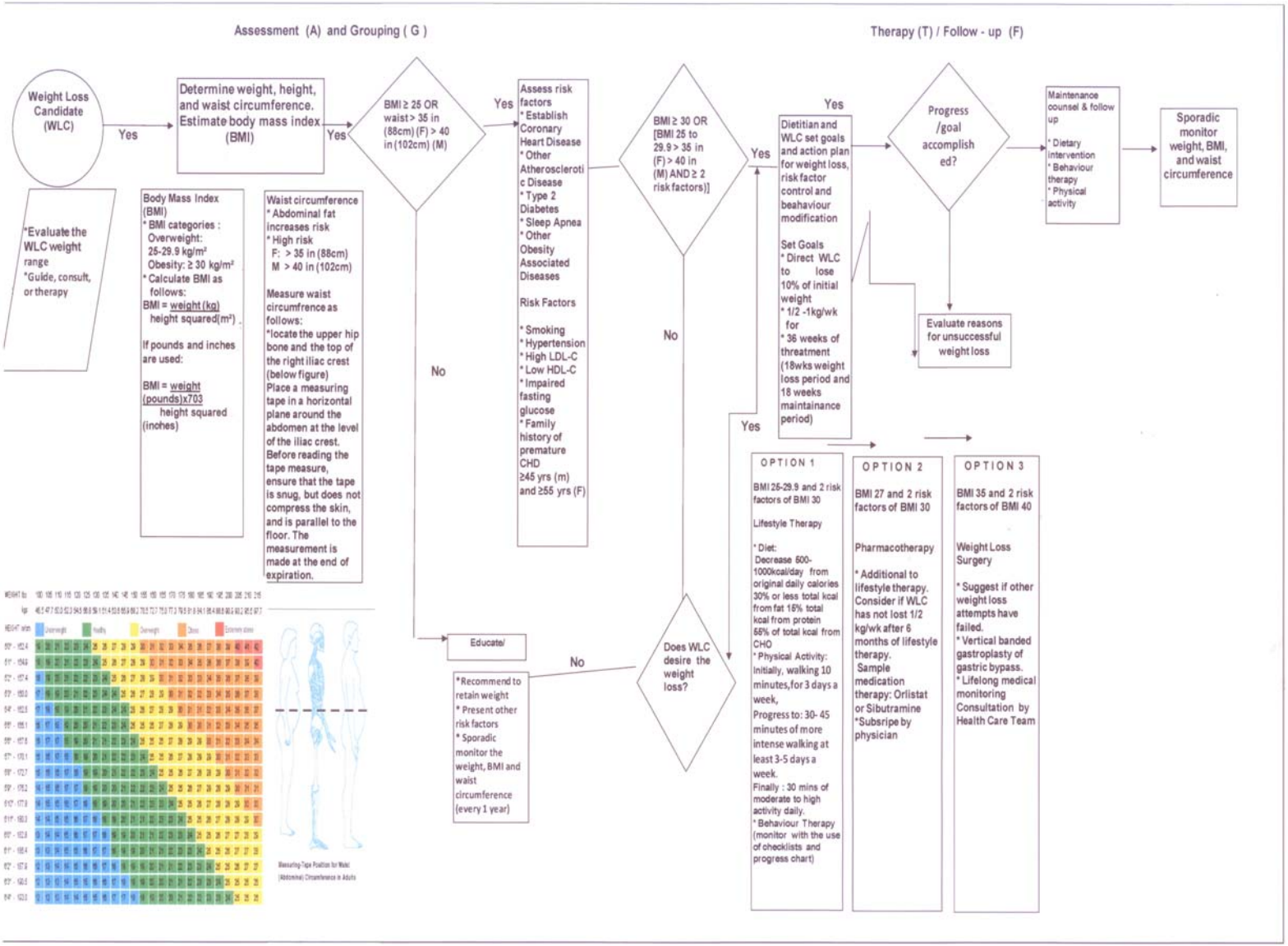
1. **AGTF -** Assessment Grouping Therapy/ Follow up
2. **Reflection on Behavioural Treatment Program**
3. **Progress Chart**
4. **Questionnaire**
5. **Checklists**


Assessment (A) and Grouping (G)
Therapy (T) / Follow - up (F)
Weight Loss Candidate (WLC)
Yes
Determine weight, height, and waist circumference. Estimate body mass index (BMI)
Yes
BMI ≥ 25 OR waist > 35 in (88cm) (F) > 40 in (102cm) (M)
Yes
Assess risk factors
* Establish Coronary Heart Disease
* Other Atherosclerotic Disease
* Type 2 Diabetes
* Sleep Apnea
* Other Obesity Associated Diseases
Risk Factors
* Smoking
* Hypertension
* High LDL-C
* Low HDL-C
* Impaired fasting glucose
* Family history of premature CHD
≥45 yrs (m) and ≥55 yrs (F)
BMI ≥ 30 OR [BMI 25 to 29.9 > 35 in (F) > 40 in (M) AND ≥ 2 risk factors)]
Yes
Dietitian and WLC set goals and action plan for weight loss, risk factor control and beahaviour modification
Set Goals
* Direct WLC to lose 10% of initial weight
* 1/2 -1kg/wk for
* 36 weeks of threatment (18wks weight loss period and 18 weeks maintainance period)
Yes
Progress /goal accomplished?
Maintenance counsel & follow up
* Dietary intervention
* Behaviour therapy
* Physical activity
Sporadic monitor weight, BMI, and waist circumference
Evaluate reasons for unsuccessful weight loss
*Evaluate the WLC weight range
*Guide, consult, or therapy
Body Mass Index (BMI)
* BMI categories :
Overweight: 25-29.9 kg/m²
Obesity: ≥ 30 kg/m²
* Calculate BMI as follows:
BMI = weight (kg) / height squared(m²)
If pounds and inches are used:
BMI = weight (pounds)x703 / height squared (inches)
Waist circumference
* Abdominal fat increases risk
* High risk
F: > 35 in (88cm)
M > 40 in (102cm)
Measure waist circumfrence as follows:
*locate the upper hip bone and the top of the right iliac crest (below figure)
Place a measuring tape in a horizontal plane around the abdomen at the level of the iliac crest. Before reading the tape measure, ensure that the tape is snug, but does not compress the skin, and is parallel to the floor. The measurement is made at the end of expiration.
No
Educate/
*Recommend to retain weight
* Present other risk factors
* Sporadic monitor the weight, BMI and waist circumference (every 1 year)
No
Does WLC desire the weight loss?
No
Yes
OPTION 1
BMI 26-29.9 and 2 risk factors of BMI 30
Lifestyle Therapy
* Diet:
Decrease 600-1000kcal/day from original daily calories
30% or less total kcal from fat
16% total kcal from protein
55% of total kcal from CHO
* Physical Activity:
Initially, walking 10 minutes, for 3 days a week,
Progress to: 30- 45 minutes of more intense walking at least 3-5 days a week.
Finally : 30 mins of moderate to high activity daily.
* Behaviour Therapy (monitor with the use of checklists and progress chart)
OPTION 2
BMI 27 and 2 risk factors of BMI 30
Pharmacotherapy
* Additional to lifestyle therapy. Consider if WLC has not lost 1/2 kg/wk after 6 months of lifestyle therapy.
Sample medication therapy: Orlistat or Sibutramine
*Subsripe by physician
OPTION 3
BMI 35 and 2 risk factors of BMI 40
Weight Loss Surgery
* Suggest if other weight loss attempts have failed.
* Vertical banded gastroplasty of gastric bypass.
* Lifelong medical monitoring
Consultation by Health Care Team

REFLECTION ON BEHAVIOURAL TREATMENT PROGRAM

The content of this behavioural therapy programme has turned into consistent for the purpose of our research. Group sessions typically included an individual, private weigh-in, review of self-monitoring records, and then a presentation of the lesson for the month. The group sessions were once every month. Participants (indentified in the protocol as WLC- Weight loss Candidate) were given specific coursework to complete over the following month, which are then reviewed at the following lesson. The following table identifies some of the topics typically addressed in our behavioural program.

Table 11. Summary of Behaviour Therapy Techniques and Tools for Weight Management

Behavioural Therapy Sessions/Project Actions		**Tools developed/modified and used**
1. Getting Started	Presents an outline of behavioural approach. Prescribes a ½ - 1 kg/week weight loss goal and an individual diet plan and goal to achieve this weight loss.	1. Nutritional & Physical Fitness Assessment Questionnaire: 2. A brief Behavioural Assessment 3. Ready or Not Estimating Weight Loss (i.e set realistic goals) 4. Appendix J. Goal Setting and Recording for Weight Management 5. Progress Chart for Anthropometric Measurements
2. Self-Monitoring	Teaches the value of	1. Food and Exercise Diaries

	recording immediately and, directly. Helps WLCBs[1] learn to find calorie values by using a reference book and reading food labels.	(every visit) 2. Checklists (week 1, 18 and 36): Checklist A – Identify your eating habits Checklist B - Identify your Physical Activity Level Checklist C - What Influences Eating Behaviour? Checklist D - What influences the Physical Activity? 3. Appendix B. Shopping- Food Labeling- Traffic Lights 4. Appendix L. Glycemic Index
3. Modifying Diet	Stresses the importance of restricting dietary fat intake. Teaches common sources of dietary fat and strategies to lower fat.	1. Appendix C. Nutrient and Calorie Modifications 2. Appendix D. Food Exchange List 3. Appendix E. Menus with Lower Calories 4. Appendix F. Cooking Can be Healthy and Tasty 5. Checklist A and C
4. Increasing Physical Activity	Introduces the importance of physical activity for energy balance and	1. Appendix H. The Physical Activity Guidelines 2. Checklist B and D

	prescribes activity goals that gradually increase over the course of the programme.	
5. Stimulus Control	Teaches WLCBs to remove cues for wrong behaviours and increase cues for appropriate behaviours.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercising
6. Changing the Act of Eating	Emphasizes the significance of eating slowly, eating in designated locations, and eating a variety of different foods. Often integrates discussion of dinning out and the food guide pyramid and the food plate.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercising 2. Appendix G. Dinning Out—Use of the Food Plate Model.
7. Problem Solving	Educates WLCBs to identify problem areas or barriers	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercising

	related to eating or exercise, to brainstorm solutions to their problems, and then select one to implement.	
8. Social Support	Helps WLCBs to learn to ask others for the type of support they need to change their behaviours.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercise
9. Restaurant Eating	Demonstrates tactics for managing eating away from home.	1. Appendix G. Dinning Out—Use of the Food Plate Model.
10. Changing Cognitions	Teaches WLCBs to distinguish their negative thoughts and counter them with positive re-framing. Positive and negative reinforcement.	1. Appendix I. Behaviour Modification Guidelines For Eating and Exercising 2. ABC Method
11. Managing Stress	Assist WLCBs learn to recognize sources of stress in their lives, examine the	2. Appendix H. The Physical Activity Guidelines 3. Appendix I. Behaviour Modification Guidelines For

	association between stress and eating, and develop new strategies for dealing with stress.	Eating and Exercise 4. Appendix J. Goal Setting and Recording for Weight Management 5. Appendix K. Food and Physical Activity Diary
12. Motivational	Guide WLCBs how to develop motivational strategies to help them maintain their habit changes long-term.	Appendix N. Progress Chart Lifestyle, Diet, and Physical Activity Appendix K. Food and Physical Activity Diary
13. Relapse Prevention	Educate WLCBs to recognize high risk situations, plan for these situations, and to keep lapses from leading to relapse.	Appendix I. Behaviour Modification Guidelines For Eating and Exercising

[1] WLCB- Weight Loss Candidate with Behaviour Modification

Analysis of the Behaviour Therapy Techniques.

1. GETTING STARTED

Setting weight goals

Individuals with a BMI >25 (overweight) and those with a BMI >30 (obese) were counseled on the importance of weight management. Cardiovascular risk factors were assessed, and weight loss recommended in those with a BMI >30 or a BMI 25-29.9 or waist circumference >80 cm (F) or > 102 cm (M) AND > 2 risk factors.

WLCB were encouraged to lose 1/2-1 kg /week. Subsequently, efforts were directed at maintaining the weight loss in the 36 weeks of maintenance. It is important to counsel WLC on achievable weight losses and attempt to reduce the discrepancy between the desired and the achievable outcomes.

The average length of weight loss treatment was 18 weeks for the intervention and the control groups, and the average weight loss for the intervention group was 11.96kg (t-test ,p-value $\leq$ 0.001) and for the control group was 5.56kg (t-test, p-value$\leq$ 0.002). During the 18 weeks of the maintenance period the 50% of the intervention group continued to lose while an additional 48% of them maintained the weight and only 2% of them gained weight

2. SELF MONITORING WEIGHT

For the purpose of our research we weighed WLCB every two week. In addition, WLCB were instructed to weight themselves at home at regular intervals, either daily or at least once a week. Data from the National Weight Control Registry suggest that successful weight losers monitor their weight quite closely. This frequent monitoring allows them to promptly take steps to correct any small increases in weight that they observe

3. MODIFYING DIETARY INTAKE

Behaviour

At the beginning of the program, participants were assigned a diet plan with a calorie goal designed to produce a ½-1/week weight loss. In this study specifically both groups (control and intervention) received an energy restricted diet (1500 ± 200 kcal/day for women and 1800 ± 200 kcal/day for men).

In this behavioural program WLCB were encouraged not only to reduce their overall calories, but also to improve eating habits such as lower their fat intake to 20-30% of their calories in order to improve weight loss and lipid responses to weight loss. The combination of restricting dietary fat and calories has been shown to be more effective then fat restriction alone or calorie restriction alone. Moreover, reducing fat intake and decreasing consumption of specific high fat food (beef, hot dogs, cheese, French fries, sweets) have been shown to be related to maintenance of weight loss. For simplicity, participants are given a fat goal in grams of fat/day (e.g. participants on a 1500 kcal diet are instructed to consume 30-45 grams of fat for a diet of 20% - 30% fat).

WLCB were asked to complete a questionnaire, checklists and keep diaries about their diet, exercise, and general weight control behaviours.

Self-Monitoring Calorie and Fat Intake. WLCB were instructed to record all food and drinks they consume and the calories and fat grams in those foods. By adding up their fat and calorie intake after each meal, weight loss candidate can measure the amount remaining for later meals. Such self-monitoring is prescribed and checked biweekly for the first 18 weeks of the weight loss program. Continued self-monitoring of intake is one of the strongest predictors of maintenance of weight loss.

Improving the quality of foods selected. WLCB were encouraged to select foods that will provide the greatest nutritional benefit for the fewest calories. The emphasis is on

reducing overall intake of fat. Strategies were provided for improving quality of foods consumed at home and when eating out. For example, WLCB were educated to consume small frequent meals, increase fiber consumption, to limit use of fat in food preparation and flavoring of foods, and to modify preferred recipes for healthier eating.

Providing Increased Structure concerning Diet. There have been several recent studies suggesting that providing structure to WLCB on what they should eat, and thus simplifying choices, preparation time, etc., can be very helpful in promoting dietary obedience. In addition more WLCB were provided with a specific meal plan, representing precisely what must be eaten for each meal and a grocery list to buy these items was also more successful than simply allowing WLCB to self-select their diet.

4. INCREASING PHYSICAL ACTIVITY

There have been a number of randomized controlled trials comparing the effects on weight loss of diet only, exercise only, and the combination (NHLBI 2004). These studies suggest that exercise alone has very small effects on body weight, and that adding exercise to a diet program increases initial weight loss by approximately 2 kg. These modest effects of exercise may well be due to the low dose of exercise used in many of these trials and the short duration of the studies. The greatest benefits of exercise are seen in the maintenance of weight loss. Of six studies that have examined long-term weight losses in diet only versus diet plus exercise, all six found that the latter had better outcomes, although in many of these studies the difference was not statistically significant (Wing et al 1999). Correlational data are even stronger in suggesting the benefits of long term physical activity for maintenance of weight loss (Pronk et al 1994).

WLCB were encouraged to increase their physical activity slowly, in order to avoid injury, and to check with their physician before undertaking strenuous activity. The goal for physical activity in this program was individualized. In general WLCB were instructed to gradually increase their activity until they achieve a level of at least 1000

kcal/week. WLCB were able to choose exactly what types of exercise they enjoy, but most use walking for the majority of their activity. A good rule of thumb is that walking 1 mile will burn approximately 150 kcal (heavier WLCB will burn more calories). Calories from other types of activities were calculated. Alternatively WLCB were assigned a goal of achieving at least 150 minutes/week of physical activity, using brisk walking or activities of similar intensity to brisk walking (Mahler 1995). Checklist b was given at the 1st, 18th and 36th week. Acitivy index was measured and WLCB improved from sedentary to moderate by the end of the 18th week (weight loss period).

*Self-Monitoring Physical Activity.*WLCB in this program was instructed to record all activities they completed. WLCB record either calories used in activity or minutes of activity.

Increasing Lifestyle Activity. WLCB in this behavioural weight loss program were helped to identify ways in which they can spend more energy in their daily activities, e.g. parking further from the store, using stairs, getting off the bus one stop earlier. Even though these lifestyle behaviour changes can add up over time to significant increases in energy expenditure, they are difficult to quantify and hard to record in self-monitoring diaries. Therefore such lifestyle activities were viewed as a supplement to longer, more structured activity/exercise bouts.

Dividing exercise into multiple short bouts. The number one barrier to exercise in this study was lack of time. To address this problem, WLCB found easier to exercise for multiple 10-minute bouts rather than one 40-minute bout. Several studies have examined this issue. In a study done by Jakicic et al 1995, WLCB were randomly assigned to exercise in one 40-minute bout/day, 5 days/week or to complete four 10-minute bouts on each of the 5 days. All other aspects of the weight loss programs were identical in the two conditions. The short-bout program produced better initial adherence and comparable long-term changes in weight and cardiovascular fitness to the long-bout program. Thus, exercising in multiple bouts may be a useful option for some participants.

Decreasing sedentary activities such as TV time. Epstein and colleagues compared the effects of increasing physical activity, decreasing sedentary behaviour, and the combination of the two in a study of overweight children aged 8-12. The sujects who were asked to decrease sedentary time had the best long-term weight control outcome and comparable improvements in fitness to the other conditions. These results suggest that as the WLCB decreased sedentary activities they adopted other more physically active pursuits (and thus improved fitness).

Decreasing barriers for physical activity. WLCB were taught strategies for dealing with common barriers to exercise, e.g. exercising in hot weather or cold weather; appropriate stretching exercises to prevent injuries. Motivation for physical activity was increased by encouraging WLCB to do a variety of different activities that they enjoy and helping WLC recognize the improvements in fitness that occurs with regular exercise (i.e. walking in the park with a friend. Exercise during lunch break with a colleague).

5. STIMULUS CONTROL

Teaches WLCBs to remove cues for wrong behaviours and increase cues for appropriate behaviours.

6. CHANGING THE ACT OF EATING

Many adults struggle with eating behaviours that lead to weight gain. Some behaviour changes that were made in this study were to eat before shopping because then food doesn't seem as appealing. Also eating only at a designated spot, and keeping high-calorie foods out of the house or work environment helped the WLCB.

7. PROBLEM SOLVING

Teaches WLCBs to identify problem areas or barriers related to eating or exercise, to brainstorm solutions to their problems, and then select one to implement (ie. Lack of

time, give ideas of exercises that don't take much time out of WLCB, like walking up the stairs, or park not very close to work).

8. SOCIAL SUPPORT

Behavioural approaches assume that the environment is an important determinant of behaviour. Most notably, the physical environment, including the sight and smell of food, can trigger feelings of hunger and influence what types of foods are selected. Other types of environmental cues can also be important. Eating and exercise behaviours can be influenced by social cues (the behaviours or attitudes of others around the WLCB) and by cognitive cues (thoughts and feelings about eating, exercise and body weight). Thus behavioural approaches include techniques to change physical, social, and cognitive cues.

9. RESTAURANT EATING

The following strategies were applied in this study. **Follow the food plate model**. – *The international guidelines for food plate model*

Make careful menu selections – pay attention to the descriptions on the menu. Dishes labeled deep-fried, pan-fried, basted, batter-dipped, breaded, creamy, crispy, scalloped, Alfredo, au gratin or in cream sauce are usually high in calories, unhealthy fats or sodium. Order items with more vegetables and choose leaner meats.

Drink water with your meal. Soda is a enormous source of empty calories. About 1 liter of asoft drink offers 425 calories and it can represent a fair portion of the daily calorie intake. Try adding a little lemon to your water or ordering unsweetened iced tea.

"Undress" your food. When choosing items, be aware of calorie- and fat-packed salad dressings, spreads, cheese, sour cream, etc. For example, ask for a grilled chicken sandwich without the mayonnaise. You can ask for a packet of ketchup or mustard and add it yourself, controlling how much you put on your sandwich.

Don't be afraid to special order. Many menu items would be healthy if it weren't for the

way they were prepared. Ask for your vegetables and main dishes to be served without the sauces. Ask for olive oil and vinegar for your salads or order the dressing "on the side" and spoon only a small amount on at a time. If your food is fried or cooked in oil or butter, ask to have it broiled or steamed.

Watch portion size - An average fast food meal can run as high as 1000 calories or more, so choose a smaller portion size, order a side salad instead of fries, and don't supersize anything. At a typical restaurant, a single serving provides enough for two meals. Take half home or divide the portion with a dining partner. Sharing might make dessert (or something else indulgent) more of an option.

Watch your salt. Fast food restaurant food tends to be very high in sodium, a major contributor to high blood pressure. Don't add insult to injury by adding more salt.

Avoid buffets – even seemingly healthy ones like salad bars. You'll likely overeat to get your money's worth. If you do choose buffet dining, opt for fresh fruits, salads with olive oil & vinegar or low-fat dressings, broiled entrees and steamed vegetables. Resist the temptation to go for seconds, or wait at least 20 minutes after eating to make sure you're really still hungry before going back for more.

Eat mindfully. Pay attention to what you eat and savor each bite. Chew your food more thoroughly and avoid eating on the run. Being mindful also means stopping before you are full. It takes time for our bodies to register that we have eaten. Mindful eating relaxes you, so you digest better, and makes you feel more satisfied.

Remember the big picture. Think of eating out in the context of your whole diet. If it is a special occasion, or you know you want to order your favorite meal at a nice restaurant, make sure your earlier meals that day are extra healthy. Moderation is always the key, but planning ahead can help you relax and enjoy your dining out experience while maintaining good nutrition and diet control.

10. CHANGING COGNITIONS

- WLCB were taught to recognize small positive changes in their behaviour and to reward themselves verbally and with small tangible rewards for this progress. Therapist praise and social support from others in the treatment program are also used as reinforcement. In this study we developed a 10 bonus award program for rewarding WLCB by getting special offers to a gym, a sport shop, a spa and a clothing shop (every 1 kilo of weight loss equals to a bonus).
- Furthermore, for the purposes of this study in order to reinforce the cognitive behaviour the ABC method was promoted and adjusted to the needs of the participants with very positive results (Table 12).

ABC Method - AFunctional Behavioural Assessment Method for Cognitive Behaviour

One of the simplest yet effective methods of functional behavioural assessment is called the "**ABC"** approach, where observations are made on Antecedents, Behaviours, and Consequences. In other words, "What comes directly before the behaviour?", "What does the behaviour look like?", and "What comes directly after the behaviour?" Once enough observations are made, the data are analyzed and patterns are identified. If there are consistent antecedents and/or consequences, then an intervention should target them in order to increase or decrease the target behaviour. This method has formed the core of positive behaviour support (Martin 2007) for behaviour modification. Behaviour modifiers like to employ a variety of evidenced-based techniques. These techniques intervene at all levels of context. For example, given specific setting events for a behaviour, a behaviour modifier may develop a neutralizing routine to eliminate that setting. If a behaviour pattern has a specific antecedent of trigger, then an antecedent control strategy can be developed to train new behaviour in the presence of the trigger. If a problem behaviour readily occurs because it achieves some function, then an alternative behaviour can be instructed and trained to occur in the context of the trigger (Waguespack et al 2006) (Roberts 2001).

How to Change the Antecedents

Changing the antecedents or triggers involves the following: the carer may do their utmost to create a calm, tranquil, supportive environment to provide a most conducive to recovery setting as possible. Trying to stick to non-threatening or pleasurable conversations such as topics relating to holidays past/future is a positive step. Playing peaceful music can also help the sufferer to feel less anxious during meal times. Further

distraction methods such as pre-planning a specific game (the geography game for example) or asking another family member to talk about the best parts of their day may also be beneficial.

How to Change the Behaviours

In order to help the individual suffering from an eating disorder the carer may need to become aware of how best to practice assertiveness skills. Ideally, the carer will be most effective if they are able to remember the key "C's" as highlighted by Treasure et al (2007); remain calm, consistent, clear, compassionate, caring and concerned. Motivate and encourage through acting as a meal coach but be careful not to collude with the eating disorder for example by providing constant unhelpful reassurance about food, size or weight.

How to Change the Consequences

Changing the consequences primarily involves helping the sufferer to manage their extremely uncomfortable and difficult to manage feelings of anxiety and loss of control. This may be achieved through the pre-planning of suitable distraction activities, relaxation or means to provide a cathartic release such as through painting or writing key thoughts down in a journal.

Source: Treasure et al 2007

Table 12-Examples of Functional Behavioural Assessment Method: ABC

	Antecedents	Behaviour	Consequences
Checklist A – Identify your eating habits	Eat a lot of meat in high quantities daily and does not consider legumes as a meal. Eat the meat with french fries and no vegetables	Eat legumes in salads mixed with fish and a favorite oil based sauce in a controlled quantity	Eat less saturated fat an less calories
Checklist B - Identify your Physical Activity Level	Live a sedentary life with no exercise	Take the stairs at work and walk to the convenience store daily to buy newspaper	Increase the energy expenditure (calories burned through exercise)
Checklist C - What Influences Eating Behaviour?	Dinning out 3 times per week at 'tavern' style restaurant	Dinning out 3 times a week, order a la carte and use the food plate model	Decrease the caloric intake
Checklist D - What influences the Physical Activity?	Too hot to exercise out and not cost effective to go to the gym	Use a dvd with different exercises and do them at home with the air-condition on	Increase the energy expenditure
Overall Consequence	Unsound behaviour towards eating habits and exercise	Modified Behaviour regarding eating habits and exercise	Weight loss and long lasting maintenance

11. MANAGING STRESS

The following strategies were applied to this study.

- **Learn how to say "no" –** Know your limits and stick to them. Whether in your personal or professional life, refuse to accept added responsibilities when you're close to reaching them. Taking on more than you can handle is a surefire recipe for stress.
- **Avoid people who stress you out** – If someone consistently causes stress in your life and you can't turn the relationship around, limit the amount of time you spend with that person or end the relationship entirely.
- **Take control of your environment** – If the evening news makes you anxious, turn the TV off. If traffic's got you tense, take a longer but less-traveled route. If going to the market is an unpleasant chore, do your grocery shopping online.
- **Avoid hot-button topics** – If you get upset over religion or politics, cross them off your conversation list. If you repeatedly argue about the same subject with the same people, stop bringing it up or excuse yourself when it's the topic of discussion.
- **Pare down your to-do list** – Analyze your schedule, responsibilities, and daily tasks. If you've got too much on your plate, distinguish between the "shoulds" and the "musts." Drop tasks that aren't truly necessary to the bottom of the list or eliminate them entirely.

- **Alter the situation**

  If WLCB couldn't avoid a stressful situation, we encourage them to try to alter it, to figure out what they can do to change things so the problem doesn't present

itself in the future. Often, this involves changing the way you communicate and operate in your daily life.

- **Express your feelings instead of bottling them up.** If something or someone is bothering you, communicate your concerns in an open and respectful way. If you don't voice your feelings, resentment will build and the situation will likely remain the same.
- **Be willing to compromise.** When you ask someone to change their behaviour, be willing to do the same. If you both are willing to bend at least a little, you'll have a good chance of finding a happy middle ground.
- **Be more assertive.** Don't take a backseat in your own life. Deal with problems head on, doing your best to anticipate and prevent them. If you've got an exam to study for and your chatty roommate just got home, say up front that you only have five minutes to talk.
- **Manage your time better.** Poor time management can cause a lot of stress. When you're stretched too thin and running behind, it's hard to stay calm and focused. But if you plan ahead and make sure you don't overextend yourself, you can alter the amount of stress you're under.

- **Adapt to the stressor**

If WLCB couldn't change the stressor, we encouraged them to change themselves. You can adapt to stressful situations and regain your sense of control by changing your expectations and attitude.

- **Reframe problems.** Try to view stressful situations from a more positive perspective. Rather than fuming about a traffic jam, look at it as an opportunity to pause and regroup, listen to your favorite radio station, or enjoy some alone time.

- **Look at the big picture.** Take perspective of the stressful situation. Ask yourself how important it will be in the long run. Will it matter in a month? A year? Is it really worth getting upset over? If the answer is no, focus your time and energy elsewhere.
- **Adjust your standards.** Perfectionism is a major source of avoidable stress. Stop setting yourself up for failure by demanding perfection. Set reasonable standards for yourself and others, and learn to be okay with "good enough."
- **Focus on the positive.** When stress is getting you down, take a moment to reflect on all the things you appreciate in your life, including your own positive qualities and gifts. This simple strategy can help you keep things in perspective.

12. MOTIVATIONAL

WLCB were encouraged to develop motivational strategies to help them maintain their habit changes long-term (i.e. fit into smaller sized clothes when lost weight and get rid of the bigger ones, set goals, joined a group with similar goals, regular visits to the dietitian reward yourself along the way).

13. RELAPSE PREVENTION

Relapse is common during lifestyle changes. In this study the maintenance period for weight management helped the WLCB maintained their weight or continue to lose weight by 98%. In the cases where a relapse had occurred, they had learned something new about themselves and about the process of changing behaviour. For example the subject on weight management who were on a restricted diet learned that they could be successful in adhering to the diet if they order from a menu rather than choose the all-you-can-eat buffet. Focusing on the successful part of the plan ("You did it for 18 weeks; what made that work?") shifts the focus from failure, promotes problem solving and

offers encouragement. The goal here was to support WLCB and re-engage their efforts in the change process. They were left with a sense of realistic goals to prevent discouragement, and their positive steps toward behaviour change should be acknowledged.

Code:

Progress chart for anthropomentric measurement and Blood Pressure

Date	Gender	Age	Height	Weight	WC	BF	Resistance	LBM/FFM	LBM/FFM	BFI/TBW	BFI/TBW	BMR	ER/DO	EO	BMI	BP
	1-M 2-F		m	kg	cm	%	ohm-Ω	kg	%	kg	%	kcal	kcal	kcal	Kg/m²	

M-Male-1 F-Female-2
WC-Waist Circumference
BF-Body Fat
LBM/ FFM-Lean Body Mass
BFI/TBW-Body Fluids
BMR-Basal Metabolic Rate
BMI-Body Mass Index
BP-Blood Pressure
ER/DO- Energy Requirements /Diet Order
EO- Excercise Order
Yellow-progress chart during 18 weeks of weight loss

Blue-progress chart during 18 weeks of maintenance

BMR
Men: BMR = 66 + (13.7 X wt in kg) + (5 X ht in cm) - (6.8 X age in years)
Women: BMR = 655 + (9.6 X wt in kg) + (1.8 X ht in cm) - (4.7 X age in years)

Lukaski & Bolonchuk's formula for total body water (TBW) is:

$TBW = 0.372(S^2/R) + 3.05(Sex) + 0.142(W) - 0.069(age)$

S = Height in centimetres
R = Resistance
W = Weight in Kg
Sex Male = 1 Female = 0
Age in years

FFM = TBW ÷ 0.73 = 38.7 ÷ 0.73 = 53.01 kg
The Fat Mass = Weight - FFM = 65 - 53.01 = 11.99kg
Body Fat % = Fat Mass ÷ Weight x 100 = 11.99 ÷ 65 x 100 = 18.5%

Resistance index (cm^2/ohm)
Males 21.06 + 0.087xage + 1.091xweight -1.801xBMI,
Females 20.35 + 0.037xage + 0.878xweight - 1.343xBMI
Resistance = (ht x ht)(cm2)/RI

Κωδικός/ Code Number: ……

Ερωτηματολόγιο για Αξιολόγηση Διατροφής και Φυσικής Κατάστασης

Nutritional & Physical Fitness Assessment Questionnaire

45-50 λεπτά για συμπλήρωση/45-50 minutes for completion

ΑΥΤΟ ΔΕΝ ΕΙΝΑΙ ΓΙΑ ΙΑΤΡΙΚΗ ΔΙΑΓΝΩΣΗ/ This is NOT A MEDICAL DIAGNOSIS
Πάντα να συμβουλεύεστε το διαιτολόγο σας πριν να αρχίσετε ένα διαιτολόγιο και τον ιατρό σας πριν να αρχίστε ή να σταματήσετε κάποια φαρμακευτική αγωγή. /Always consult with your registered dietitian prior to starting a nutritional program and your doctor when receiving or discontinuing any prescription medications.

Δημογραφικά Στοιχεία/Demographic Questions:

1.Ονοματεπώνυμο/Name:	**2.Ημερομηνία/Date:**

3.Ημερομηνία Γεννήσεως/Birthdate:

4.Φύλο/Gender:	**Άνδρας** **Male**	
	Γυναίκα **Female**	

5.Διεύθυνση/Address: **Τ.Κ. _____**	**Ηλεκτρονική Διεύθυνση:** **E-mail address:**

Υπογραφή/Signature:

6. Επάγγελμα/ Occupation:

Αγρότης /Agricultural/ farming	1
Εργάτης /Industry	2
Πνευματική εργασία-γραφειακή /Mental involvement/ Office work	3
Φοιτητής /Student	4
Οικοκυρά/ Housewife	5
Συνταξιούχος/ Retired	6
Άνεργος /Unemployed	7
Άλλο/ Other ……	8

7. Συνολικά πόσα χρόνια εκπαίδευσης έχετε συμπληρώσει/Total number of years of education you have completed :	

8. Ποια η οικογενειακή σας κατάσταση/ Family Status:

1. Έγγαμος (η)/Married	1
2. Διαζευγμένος (η)/Divorced	2
3. Άγαμος (η) /Single	3
4. Χήρος (α) /Widow	4

9. Πόσα άτομα ζουν στο σπίτι μαζί σας/Number of people living in the same household with you:

10. Καταγράψετε τις πέντε πιο σημαντικές ανησυχίες για την υγεία σας με σειρά προτεραιότητας/Please list your five major health concerns in order of importance:

1	
2	
3	
4	
5	

Μέρος Ι: Έλεγχος Σωματικής Σύστασης και Μεταβολικού Ρυθμού /PART I: Body Fat Measurement

ΑΠΟΤΕΛΕΣΜΑΤΑ/ RESULTS

ΗΛΙΚΙΑ: /AGE:	ΒΑΡΟΣ:/ WEIGHT:	ΥΨΟΣ: /HEIGHT:

ΠΟΣΟΣΤΟ ΛΙΠΟΥΣ/ PERCENTAGE OF BODY FAT	%
ΕΛΑΧΙΣΤΟ ΛΙΠΟΣ/ MINIMUM RECCOMENDED FAT	%
ΜΕΓΙΣΤΟ ΛΙΠΟΣ/ MAXIMUM RECCOMENDED FAT	%
ΒΑΡΟΣ ΛΙΠΟΥΣ (kg)/ FAT WEIGHT	
ΕΛΑΧΙΣΤΟ ΒΑΡΟΣ ΛΙΠΟΥΣ (kg)/ MINIMUM RECCOMENDED FAT WEIGHT	
ΜΕΓΙΣΤΟ ΒΑΡΟΣ ΛΙΠΟΥΣ (kg)/ MAXIMUM RECCOMENDED FAT WEIGHT	
ΔΕΙΚΤΗΣ ΜΑΖΑΣ ΣΩΜΑΤΟΣ (βάρος/ύψος2)/ BODY MASS INDEX (BMI) WEIGHT/HEIGHT^2	
ΣΤΟΧΟΣ ΔΕΙΚΤΗ ΜΑΖΑΣ ΣΩΜΑΤΟΣ/BMI	18.5-24.9
ΑΓΩΓΙΜΟΤΗΤΑ ΣΩΜΑΤΟΣ (R)/BODY CONDUCTIVITY	
ΒΑΣΙΚΟΣ ΜΕΤΑΒΟΛΙΚΟΣ ΡΥΘΜΟΣ (kcal)/BASIC METABOLIC RATE	
ΕΛΑΧΙΣΤΟ ΒΑΡΟΣ(kg)/MINIMUM RECCOMENDED BODY WEIGHT	
ΜΕΓΙΣΤΟ ΒΑΡΟΣ (kg)/MAXIMUM RECCOMENDED BODY WEIGHT	
ΑΛΙΠΟ ΒΑΡΟΣ (kg)/LEAN WEIGHT (Fat Free Mass- FFM)	
ΠΟΣΟΣΤΟ ΑΛΙΠΟΥ ΒΑΡΟΥΣ/PERCENTAGE OF LEAN WEIGHT	%
ΣΤΟΧΟΣ ΑΛΙΠΟΥ ΒΑΡΟΥΣ/LEAN BODY MASS GOAL	≥70%
ΝΕΡΟ ΣΩΜΑΤΟΣ (ΛΙΤΡΑ/PINTS)/BODY FLUIDS	
ΠΟΣΟΣΤΟ ΝΕΡΟΥ ΣΩΜΑΤΟΣ/PERCENTAGE OF BODY FLUIDS	%
ΕΛΑΧΙΣΤΟ ΝΕΡΟ/ MINIMUM RECCOMENDED BODY FLUIDS	55%
ΜΕΓΙΣΤΟ ΝΕΡΟ/MAXIMUM RECCOMENDED BODY FLUDS	60%

ΠΙΕΣΗ ΑΙΜΑΤΟΣ (ΠΑ)/BLOOD PRESSURE (BP) =

Περίμετρος Μέσης (cm)/Waist Circumference(cm)			
Κίνδυνος μεταβολικών επιπλοκών/ *Risk for Metabolic Complication*	**Περίμετρος Μέσης (cm)/ Waist Circumference(cm)**		
	Άνδρες/Men	**Γυναίκες/Woman**	
Αυξημένος /High Risk	>94	>80	
Εξαιρετικά αυξημένος/Very High Risk	>102	>88	

ΔΙΑΤΡΟΦΙΚΟ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ/ NUTRITION QUESTIONNAIRE

Μέρος ΙΙ Διαβάστε τις ακόλουθες ερωτήσεις και συμπληρώστε τον αριθμό που αντιστοιχεί: /PART II Read the following questions and fill in the number that applies:

ΚΕΥ: **0 (ή αφήστε κενό) (or leave blank) = Δεν καταναλώνετε ή χρησιμοποιείται /Do not consume or use**
1 = Καταναλώνετε ή χρησιμοποιείται 2-3 φορές /μήνα /Consume or use 2-3 times/month
2 = Καταναλώνετε ή χρησιμοποιείται εβδομαδιαία/Consume or use weekly
3 = Καταναλώνετε ή χρησιμοποιείται καθημερινά/Consume or use daily

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ΔΙΑΤΡΟΦΗ/DIET

• Αλκοόλ /Alcohol	
• Υποκατάστατα της ζάχαρης/Artificial sweeteners	
• Καραμέλες ή άλλα γλυκά /Candy or other sweets	
• Αεριούχα ποτά-αναψυκτικά/Carbonated beverages	
• Ταπάκο/ Chewing tobacco	
• Τσιγάρο /Cigarettes	
• Πούρα/Cigars	
• Καφέ /Coffee	

- Τρώω συχνά στο ταχυφαγείο/Eat fast food regularly
- Τηγανιτά φαγητά /Fried foods
- Επεξεργασμένα κρέατα/λουκάνικα/ Luncheon meats/ hot dogs
- Μαργαρίνη /Margarine
- Γαλακτοκομικά προϊόντα /Milk products
- Τσάι/ Non-herbal tea
- Είδη αρτοποιήματος/ Refined flour/ Baked goods
- Άσπρη ζάχαρη /Refined sugar
- Βιταμίνες και ιχνοστοιχεία /Vitamins and minerals
- Νερό, αεριούχο/Water, distilled
- Νερό της βρύσης /Water, Tap
- Νερό πηγής/Water, well
- Συχνή χρήση διαιτολογίου για αδυνάτισμα/ Diet often

ΤΡΟΠΟΣ ΖΩΗΣ/LIFESTYLE

- Φορές που ασκήστε ανά εβδομάδα (0=καμια φορα,1 = μία φορά την εβδομάδα, 2 = 2-4 φορές/εβδομάδα, 3 = 5 φορές /εβδομάδα)/Times you exercise per week (0- never,1 = once a week, 2 = 2-4 times/week, 3 = 5 times a week)
- Αλλαγή εργασίας (3= μέσα στους τελευταίους 2 μήνες, 2= μέσα στους τελευταίους 6 μήνες, 1= μέσα στους τελευταίους 12 μήνες.0= δεν αλλαξα)/Changed jobs (3= within last 2 months, 2= within last 6 months, 1=

within last 12 months,0= I did not change.)

- Διαζευγμένος (3= μέσα στους τελευταίους 6 μήνες, 2= μέσα στον τελευταίο χρόνο, 1= μέσα στα τελευταία 2 χρόνια, 0=δεν ισχυει)/Divorced (3= within last 6 months, 2= within last year, 1= within last 2 years, 0=not applicable)
- Δουλεύεις πάνω από 60 ώρες/εβδομάδα (3= πάντα, 2= συνήθως, 1= περιστασιακά, 0= ποτέ)/Work over 60 hours/week (3= always, 2= usually, 1= occasionally, 0= never)

ΦΑΡΜΑΚΑ/MEDICATIONS

Σημειώστε με ένα (√) ποια φάρμακα παίρνετε ή έχετε πάρει τον τελευταίο μήνα:/Indicate with a checkmark or circle any medications you're currently taking or have taken in the last month:

1. Αντιοξικά /Antacids
2. Αντιβιοτικά /Antibiotics
3. Αντιπαροξυσμικά /Anticonvulsants
4. Αγχολυτικά /Antidepressants
5. Μυκητοκτόνα /Antifungals
6. Ασπιρίνη / Παυσίπονα /Aspirin/Ibuprofen
7. Ψεκαστήρες άσθματος/ Asthma inhalers
8. Beta blockers
9. Χημειοθεραπεία /Chemotherapy
10. Κορτιζόνη /Cortisone
11. Φαρμακευτική αγωγή για διαβήτη /Diabetic medications
12. Διουρητικά /Diuretics

13. Οιστρογόνα /προγεστερόνη /Estrogen/Progesterone	
14. Φαρμακευτική αγωγή για καρδιακά προβλήματα/Heart medications	
15. Πίεση /High blood pressure	
16. Ορμονική Θεραπεία /Hormone Therapy	
17. Καθαρτικά/Laxatives	
18. Ινσουλίνη /Insulin	
19. Αντισυλληπτικά /Oral/implant contraceptives	
20. Έκθεση σε ακτινοβολία /Radiation exposure	
21. Ηρεμιστικά /χάπια ύπνου /Relaxants/Sleeping pills	
22. Φαρμακευτική αγωγή για θυρεοειδή /Thyroid medication	
23. Φαρμακευτική αγωγή για έλκος /Ulcer medications	

24. **Άλλη φαρμακευτική αγωγή**:/**Other medications**:

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ΜΕΡΟΣ ΙΙΙ/PART III

Διαβάστε τις πιο κάτω ερωτήσεις και συμπληρώστε τον αριθμό που αντιστοιχεί: /Read the following questions and fill in the number that applies:

(Πόσο σημαντικά είναι τα συμπτώματα? Πόσο αληθινή είναι η δήλωση; 0 σημαίνει καθόλου, 3 σημαίνει εξαιρετικά αλήθεια.)/(How significant is the symptom? How true is the statement? 0 means not at all, 3 means extremely true.)

ΚΕΥ: 0 (ή αφήστε κενό) = Όχι δεν έχω το σύμπτωμα, το σύμπτωμα δεν

παρουσιάζεται/ 0 (or leave blank) = No or Do not have the symptom, the symptom does not occur

1 = Ναι ή είναι ένα ελαφρύ σύμπτωμα ή σπάνια συμβαίνει (μία φορά το μήνα ή λιγότερο/ 1 = Yes or It is a minor or mild symptom or it rarely occurs (once a month or less)

2 = είναι ένα μέτριο σύμπτωμα ή εμφανίζεται περιστασιακά (εβδομαδιαία)/ 2 = It is a moderate symptom or it occasionally occurs (weekly)

3 = είναι ένα σοβαρό σύμπτωμα ή εμφανίζεται συχνά (καθημερινά)/

3 = It is a severe symptom or it frequently occurs (daily)

Παράγραφος 1 – Ανώτερο γαστροεντερικό σύστημα /Section 1 – Upper Gastrointestinal System

• Ρέψιμο ή αέρια μέσα σε 1 ώρα μετά από το γεύμα /Belching or gas within 1 hr. of a meal	
• Καούρα ή παλοιδρόμηση/ Heartburn or acid reflux	
• Φούσκωμα αμέσως μετά το φαγητό/Bloating shortly after eating	
• Είσαι αυστηρός χορτοφάγος (όχι γαλακτοκομικά, κρέας, ψάρι και αυγά) /Are you a vegan (no dairy, meat, fish or eggs)	
• Άσχημη αναπνοή (halitosis)/Bad breath (halitosis)	
• Loss of taste for meat /Απώλεια προτίμησης για το κρέας	
• Ενισχυμένη οσμή του ιδρώτα/ Sweat has a strong odor	
• Το στομάχι αναστατώνετε όταν παίρνω βιταμίνες /Stomach upset by taking vitamins	
• Αίσθηση «υπερβολικού γεύματος» μετά τα γεύματα /Sense of excess fullness after meals	

- Αποφεύγεις το πρόγευμα; /Do you feel like skipping breakfast? | |
- Αισθάνεσαι καλύτερα αν δεν φας; /Do you feel better if you don't eat? | |
- Νύστα μετά τα γεύματα /Sleepy after meals | |
- Σπάσιμο και ξεφλούδισμα νυχιών/ Fingernails chip, peel or break easily | |
- Αναιμία που δεν ανταποκρίνεται στην χορήγηση σιδήρου/ Anemia unresponsive to iron | |
- Στομαχικός πόνος ή κράμπες/ Stomach pains or cramps | |
- Χρόνια Διάρροια /Diarrhea, chronic | |
- Διάρροια αμέσως μετά το γεύμα /Diarrhea shortly after meals | |
- Σκούρα κόπρανα/ Black or tarry stools | |
- Άπεπτα τρόφιμα στα κόπρανα/ Undigested food in stool | |

Παράγραφος 2 – Συκώτι και χοληδόχος κύστη /Section 2 – Liver and Gallbladder

- Πόνος μεταξύ των ώμων /Pain between shoulder blades | |
- Αναστατωμένο στομάχι με λαδερά φαγητά/Stomach upset by greasy foods | |
- Λαδερά κόπρανα/ Greasy or shiny stools | |
- Ναυτία /Nausea | |
- Αναγούλες στην θάλασσα, αυτοκίνητο, αεροπλάνο, αναγούλες με κίνηση/ Sea, car or airplane sickness, motion sickness | |
- Ιστορικό με πρωινή αδιαθεσία (1=ναι, 0=όχι)/History of morning sickness (1 = yes, 0 = no) | |

• Ασπριδερό χρώμα στα κόπρανα /Light or clay colored stools	
• Ξηροδερμία/ φαγούρα στα πόδια και/ή ξεφλούδισμα στα πόδια/Dry skin, itchy feet and/or skin peels on feet	
• Πονοκέφαλος γύρο από τα μάτια/Headache over the eye	
• Συνήθεια για αλκοόλ ανά εβδομάδα (0 = < 3/ εβδομάδα, 1 = < 7/ εβδομάδα, 2 = < 14/ εβδομάδα, 3 = > 14/ εβδομάδα)/Alcoholic beverages per week (0 = < 3/ week, 1 = < 7/ week, 2 = < 14/ week, 3 = > 14/week)	
• Ανάρρωση από το αλκοολισμό (1 = ναι, 0 = όχι)/Recovering alcoholic (1 = yes, 0 = no)	
• Επακόλουθα μέθης/ Hangovers after drinking alcohol	
• Ιστορικό με κατάχρηση εξαρτησιογόνων ουσιών και αλκοόλ(1 = ναι, 0 = όχι)/ History of drug or alcohol abuse (1 = yes, 0 = no)	
• Ιστορικό ηπατίτιδας (1 = ναι , 0 = όχι)/History of hepatitis (1 = yes, 0 = no)	
• Μακροπρόθεσμη χρήση από συντακογραφούμενα φάρμακα (1 = ναι , 0 = όχι)/Long term use of prescription medications (1 = yes, 0 =no)	
• Ευαισθησία στα χημικά (αρώματα, καθαριστικά, εντομοκτόνα, exhaust, κτλ) /Sensitive to chemicals (perfume, cleaning solvents, insecticides, exhaust, etc.)	
• Sensitive to tobacco smoke/Ευαίσθητος στον καπνό του τσιγάρου	
• Έκθεση σε αναθυμιάσεις πετρελαίου/ Exposure to diesel fumes	
• Πόνος κάτω από την δεξιά πλευρά των τοιχωμάτων της θωρακικής κοιλότητας/ Pain under right side of rib cage	
• Αιμορροΐδες ή κιρσώδεις φλέβες /Hemorrhoids or varicose veins	
• Επεισόδια πόνου στη χολή (παρελθόν ή παρόν) /Gallbladder attacks (past or present)	
• Αφαίρεση χοληδόχου κύστης (1 = ναι , 0 = όχι)/Gallbladder removed (1 = yes, 0 = no)	

- Πικρή γεύση στο στόμα, ειδικά μετά τα γεύματα /Bitter taste in mouth, especially after meals
- Αρρωσταίνω όταν πίνω κρασί/Become sick if drinking wine
- Αν πιω αλκοόλ, εύκολα μεθάω /If drinking alcohol, easily intoxicated
- Χρήση υποκατάστατων ζάχαρης με ασπαρτάμη /Aspartame consumption
- Ενόχληση από την ασπαρτάμη /Bothered by aspartame
- Χρόνια κούραση /Chronic fatigue

Παράγραφος 3-Λεπτό έντερο/ Section 3 – Small Intestine

- Διατροφικές αλλεργίες /Food allergies
- Φούσκωμα στο στομάχι 1-2ώρες μετά το φαγητό/ Abdominal bloating 1 to 2 hours after eating
- Κάποια φαγητά με κάνουν να νοιώθω κουρασμένος ή να φουσκώνω (1= ναι, 0= όχι) /Specific foods make you tired or bloated (1= yes, 0= no)
- Ταχυπαλμίες μετά το φαγητό /Pulse speeds after eating
- Αερομεταφερόμενες αλλεργίες /Airborne allergies
- Εξανθήματα/ Experience hives
- Συμφόρηση ιγμόρειων/ Sinus congestion, "stuffy head"
- Λιγούρα για ψωμί ή μακαρόνια/ Crave bread or noodles
- Εναλλασσόμενη δυσκοιλιότητα και διάρροια/Alternating constipation and diarrhea
- Ασθένεια Crohn's (1 = ναι, 0 = όχι)/Crohn's disease (1 = yes, 0 = no)

• Ευαισθησία σίτου ή σιταριού/Wheat or grain sensitivity	
• Ευαισθησία στα γαλακτοκομικά /Dairy sensitivity	
• Υπάρχουν τρόφιμα που δεν θα μπορούσατε να σταματήσετε να καταναλώνετε (1 = ναι, 0 = όχι)/Are there foods you could not give up (1 = yes, 0 = no)	
• Άσθμα, μολύνσεις κόλπων, βουλομένη μύτη /Asthma, sinus infections, stuffy nose	
• Bizarre vivid or nightmarish dreams/Παράξενα ζωηρά ή εφιαλτικά όνειρα	
• Χρήση μη –συντακογραφούμενων φαρμάκων/Use over-the-counter pain medications	

Παράγραφος 4 – Χοντρό έντερο /Section 4 – Large Intestine

• Φαγούρα στον πρωκτό /Anus itches	
• Επικολλημένη γλώσσα (ασπριδερά σημάδια)/ Coated tongue	
• Χρήση αντιβιοτικών για την χρονική διάρκεια (1 = < 1 μήνα., 2 = < 3 μήνες., 3 = > 3 μήνες.)/Taken any antibiotic for a combined time of (1 = < 1 mo., 2 = < 3 mos., 3 = > 3 mos.)	
• Μυκητιάσεις/ Fungus or yeast infections	
• «Πόδια Αθλητών» Μύκητες Νυχιών/"athletes foot", nail fungus	
• Κατανάλωση ζάχαρης, αμύλου, αλκοόλ, αυξάνει τα συμπτώματα μυκήτων/ Eating sugar, starch or drinking alcohol increases yeast symptoms	
• Σκληρά κόπρανα ή με δύσκολη αφόδευση /Stools hard or difficult to pass	
• Ιστορικό από παράσιτα (1 = ναι, 0 = όχι)/History of parasites (1 = yes, 0 = no)	
• Αφόδευση λιγότερο από μια φορά την ημέρα/ Less than one bowel movement per day	

• Τα κόπρανα έχουν γωνιές ή οι άκριες έχουν σχήμα επίπεδο ή κόμπου/ Stools have corners or edges are flat or ribbon shaped	
• Μη –σχηματισμένα κόπρανα (χαλαρά) /Stools are not well formed (loose)	
• Κολίτιδα ευερέθιστων εντέρων ή βλέννας /ευερέθιστο έντερο/Irritable bowel or mucus colitis	
• Αίμα στα κόπρανα/ Blood in stool	
• Βλέννα στα κόπρανα/ Mucus in stool	
• Υπερβολική και αποκρουστική μυρωδιά αερίων /Excessive foul smelling lower bowel gas	
• Άσχημη αναπνοή ή δυνατή σωματική οσμή/ Bad breath or strong body odors	
• Επίπονη ή πίεση στις εξωτερικές πλευρές των ισχίων(Iliotibial Band)/ Painful to press along outer sides of thighs (Iliotibial Band)	
• Κράμπες στην κατώτερη κοιλιακή περιοχή/ Cramping in lower abdominal region	
• Dark circles under eyes /Μαύροι κύκλοι γύρω από τα μάτια	

Παράγραφος 5 – Ανάγκες για Ιχνοστοιχεία /Section 5 – Mineral Needs

• Ιστορικό του καρπικού συνδρόμου σήρραγγων (Carpal Tunnel Syndrome) (1 = ναι, 0 = όχι /History of Carpal Tunnel Syndrome (1 = yes, 0 = no	
• Ιστορικό χαμηλού κοιλιακού πόνου στην δεξιά πλευρά (1 = ναι, 0 = όχι)/History of lower right abdominal pain (1 = yes, 0 = no)	
• Ιστορικό από κατάγματα/History of stress fractures	
• Οστική απώλεια (μειωμένη πυκνότητα στην ανίχνευση οστών) /Bone loss (reduced density on bone scan)	
• Είστε ποιο κοντοί από ότι ήσασταν στο παρελθόν (1 = ναι, 0 = όχι)/Are you shorter than you used to be? (1 = yes, 0 = no)	

• Κράμπες στην γαστροκνήμη, πόδι ή δάκτυλο του ποδιού στην ξεκούραση/ Calf, foot or toe cramps at rest	
• Πληγές από κρύο, φουσκάλες πυρετού, Δερματικός έρπεις, /Cold sores, fever blisters or herpes lesions	
• Frequent fevers/Συχνοί πυρετοί	
• Frequent skin rashes and / or hives/Συχνές αναφυλαξίες δερμάτων	
• Είχατε ποτέ κοιλώδες δίσκο (1=ναι, 0=όχι)/Have you ever had a herniated disc? (1 = yes, 0 = no)	
• Υπερβολικά ευλύγιστοι σύνδεσμοι , «Διπλές Συνδέσεις» /Excessively flexible joints, "double jointed"	
• Joints pop or click/Οι ενώσεις σκάουν ή χτυπούν	
• Pain or swelling in joints/Πόνος ή διόγκωση στις ενώσεις	
• Θυλακίτιδα ή τενοντίτιδα /Bursitis or tendonitis	
• Ιστορικό με άκανθα στα οστά (1=ναι, 0=όχι)/History of bone spurs (1 = yes, 0 = no)	
• Πρωινή ακαμψία /Morning stiffness	
• Εμετός και ναυτία /Vomiting or nausea	
• Επιθυμία σοκολάτας /Crave chocolate	
• Πόδια που έχουν δυνατή οσμή/ Feet have a strong odor	
• Τάση για αναιμία / Tendency to anemia	
• Το άσπρο των ματιών (σκληρός χιτώνας) χρωματίζεται μπλε/ Whites of eyes (sclera) blue tinted	
• Hoarseness/Βραχνάδα	
• Δυσκολία στην κατάποση /Difficulty swallowing	

• Όγκος στο λαιμό/ Lump in throat	
• Ξηρό στόμα, μάτια ή /και μύτη /Dry mouth, eyes and / or nose	
• Συχνός μετεωρισμός / Gag easily	
• Άσπρα σημάδια στα νύχια /White spots on fingernails	
• Η περικοπές θεραπεύονται αργά και/ ή μένει σημάδι εύκολα /Cuts heal slowly and / or scar easily	
• Μειωμένη αίσθηση της γεύσης ή της μυρωδιάς/Decreased sense of taste or smell	

Παράγραφος 6 – Ουσιώδη λιπαρά οξέα /Section 6 – Essential Fatty Acids

• Η ασπιρίνη είναι αποτελεσματική στην ανακούφιση του πόνου (1 = ναι, 0 = όχι)/Aspirin is an effective pain reliever (1 = yes, 0 = no)	
• Επιθυμία για λιπαρά φαγητά /Crave fatty or greasy foods	
• Μειωμένη σε λίπος διατροφή (παρελθόν ή παρόν) /Low or reduced fat diet (past or present)	
• Πονοκέφαλοι έντασης στη βάση του κρανίου /Tension headaches at base of skull	
• Πονοκέφαλοι όταν βρίσκομαι έξω στον ήλιο /Headaches when out in the hot sun	
• Εύκολα ηλιακά εγκαύματα /Sunburn easily or suffer sun poisoning	
• Οι μυς κουράζονται εύκολα /Muscles easily fatigued	
• Ξηρό λεπιοειδής δέρμα ή και με πιτυρίαση /Dry flaky skin and or dandruff	

Παράγραφος 7 – Χειρισμός Ζάχαρης /Section 7 – Sugar Handling

• Ξυπνάς λίγες ώρες μετά που έχεις πέσει για ύπνο, δύσκολο να ξανακοιμηθείς /Awaken a few hours after falling asleep, hard to get back to sleep	
• Επιθυμία για γλυκά /Crave sweets	
• Τρώω επιδόρπιο ή γλυκά στα ενδιάμεσα γεύματα /Eat desserts or sugary snacks	
• Καταβρόχθησμα ή ανεξέλεγκτη κατανάλωση /Binge or uncontrolled eating	
• Υπερβολική όρεξη /Excessive appetite	
• Επιθυμία για καφέ ή ζάχαρη το απόγευμα /Crave coffee or sugar in the afternoon	
• Απογευματινή νύστα /Sleepy in afternoon	
• Κούραση που ανακουφίζεται με την κατανάλωση φαγητού/Fatigue that is relieved by eating	
• Πονοκέφαλος αν δεν καταναλώνεται κάποιο γεύμα ή καθυστερεί /Headache if meals are skipped or delayed	
• Οξύθυμος πριν τα γεύματα /Irritable before meals	
• Τρέμουλο αν καθυστερούν τα γεύματα /Shaky if meals delayed	
• Αριθμός ατόμων στην οικογένεια με διαβήτη (0 = κανένα, 1 = 2 ή λιγότερα, 2 = μεταξύ 2 – 4, 3 = περισσότερα από 4)/Family members with diabetes (0 = none, 1 = 2 or less, 2 = Between 2 – 4, 3 = More than 4)	
• Συχνή δίψα /Frequent thirst	
• Συχνή ούρηση /Frequent urination	

Παράγραφος 8 – Ανάγκη Βιταμινών /Section 8 – Vitamin Need

• Οι μυς κουράζονται εύκολα /Muscles become easily fatigued	
• Αισθάνομαι άσχημα μετά από μέτρια άσκηση /Feel worse, sore after moderate exercise	
• Τρωτός στα δαγκώματα εντόμων/ Vulnerable to insect bites	
• Απώλεια μυικής δύναμης, βαρετά χέρια/πόδια/ Loss of muscle tone, heaviness in arms / legs	
• Διευρυμένη καρδιά ή ανεπάρκεια καρδιάς/ Enlarged heart, or heart failure	
• Αργός σφυγμός/ κάτω από 65 (1 = ναι, 0 = όχι)/ Pulse slow / below 65 (1 = yes, 0 = no)	
• Κουδούνισμα στα αυτιά/εμβοή / Ringing in the ears / Tinnitus	
• Μούδιασμα, τσούξιμο ή φαγούρα στα άκρα /Numbness, tingling or itching in extremities	
• Καταθλιπτικός /Depressed	
• Φόβος της επικείμενης μοίρας /Fear of impending doom	
• Πεσιμιστής, ανήσυχος/Worrier, apprehensive, anxious	
• Νευρικός ή ταραγμένος /Nervous or agitated	
• Συναισθήματα της αβεβαιότητας /Feelings of insecurity	
• Δυνατός κτύπος της καρδιάς/ Heart races	
• Μπορείτε να ακούσετε την καρδιά σας να χτυπά στο μαξιλάρι την νύχτα /Can hear heart beat on pillow at night	
• Τραντάζεται ολόκληρο το σώμα ή τα άκρα όταν πέφτεις για ύπνο /Whole body or limb jerk as falling asleep	
• Ιδρώτας κατά την διάρκεια της νύκτας /Night sweats	

• Σύνδρομο του ανήσυχου ποδιού /Restless leg syndrome	
• Χειλόσις (πληγές στις γωνιές του στόματος) / Cheilosis (cracks at corner of mouth)	
• Ευαίσθητο δέρμα, εύκολος ερεθισμός (όπως στο ξύρισμα) /Fragile skin, easily chaffed, as in shaving	
• Πολύποδες /Polyps	
• Ευαισθησία στο γλουταμικό μονονάτριο (MSG)/MSG sensitivity	
• Ξυπνώ χωρίς να θυμάμαι τα όνειρα /Wake up without remembering dreams	
• Χρήση αντισυλληπτικών/ Take birth control pills	
• Μικρές προσκρούσεις πίσω από τα χέρια/Small bumps on back of arms	
• Το δυνατό φως ενοχλεί τα μάτια την νύχτα /Strong light at night irritates eyes	
• Η μύτη αιμορραγεί ή και τείνετε να μωλωπίσετε εύκολα /Nose bleeds and / or tend to bruise easily	
• Αιμορραγία ειδικά όταν βουρτσίζω τα δόντια /Bleeding gums especially when brushing teeth	

Παράγραφος 9 – Επινεφρίδια /Section 9 – Adrenal

• Τείνετε να είστε «άτομο της νύκτας»/Tend to be a "night person"	
• Δυσκολία στον ύπνο/Difficulty falling asleep	
• Αργοκίνητος το πρωί /Slow starter in the morning	
• Δυσκολία στο να ηρεμήσετε μετά από ένταση/ Keyed up, trouble calming down	
• Υψηλή πίεση αίματος (κανονική 120-80)/High blood pressure (normal 120/80)	

• Headache after exercising /Πονοκέφαλος μετά την άσκηση	
• Παράξενο αίσθημα ή ανησυχία όταν πίνετε καφέ/ Feeling wired or jittery if drinking coffee	
• Τρίσμα των δοντιών/ Clench or grind teeth	
• Ήρεμος εξωτερικά, ανήσυχος εσωτερικά/ Calm on the outside, troubled inside	
• Χρόνιος χαμηλός πόνος στην πλάτη, χειροτερεύει με την κούραση/ Chronic low back pain, worse with fatigue	
• Ζαλίζεσαι όταν ξαφνικά σταθείς όρθιος /Become dizzy when standing up suddenly	
• Αρθριτικά /Arthritic tendencies	
• Επιθυμία αλατισμένων φαγητών /Crave salty foods	
• Αλάτι στο φαγητό πριν το δοκιμάσω /Salt foods before tasting	
• Ιδρώνω εύκολα /Perspire easily	
• Χρόνια κούραση ή αισθάνομαι νύστα συνεχώς /Chronic fatigue, or get drowsy often	
• Χασμουριέμαι το απόγευμα/Afternoon yawning	
• Πονοκέφαλος το απόγευμα /Afternoon headache	
• Άσθμα ή δυσκολία στην αναπνοή /Asthma, wheezing or difficulty breathing	
• Πόνος ενδιάμεσα ή στην εσωτερική πλευρά του γόνατου /Pain on the medial or inner side of the knee	
• Τάση διαστρέμματος στους αστράγαλους ή «νάρθηκες αντικνημίων»/ Tendency to sprain ankles or "shin splints"	
• Ανάγκη να φοράς γυαλιά του ήλιου /Tendency to need to wear sunglasses	
• Αλλεργίες ή και εξανθήματα/ Allergies and / or hives	

- Αδυναμία, ζαλάδα/Limitations, dizziness

Παράγραφος 10 – Υπόφυση /Section 10 – Pituitary

- Ψηλός πάνω από 6' 6" (ύψος ενηλικίωσης)/Over 6' 6" tall (Mature height)
- Πρόωρη σεξουαλική ανάπτυξη (πριν από τα 10 χρόνια) (1 = ναι, 0 = όχι) /Early sexual development (before age 10) (1 = yes, 0 = no)
- Αυξημένη λίμπιντο /Increased libido
- Πονοκέφαλοι / Splitting type headache
- Έλλειψη μνήμης /Memory failing
- Ικανότητα ανοχής της ζάχαρης/ Ability to tolerate sugar
- Κάτω από 4' 10" (ύψος ενηλικίωσης) /Under 4' 10" (Mature height)
- Μειωμένη λίμπιντο /Decreased libido
- Παράξενη δίψα/ Abnormal thirst
- Συσσώρευση βάρους γύρο από τα ισχία ή την μέση /Weight gain around hips or waist
- Εμμηνορροϊκές αναταραχές/Menstrual disorders
- Καθυστέρηση στην σεξουαλική ανάπτυξη (μετά τα 13 χρόνια) (1 = ναι, 0 = όχι)/Delayed (after age 13) sexual development (1 = yes, 0 = no)
- Τάση για έλκος ή κολίτιδα /Tendency to ulcers or colitis

Παράγραφος 11 – Θυροειδής /Section 11 – Thyroid

• Αλλεργία στο ιώδιο /Allergic to iodine	
• Δυσκολία να βάλεις βάρους, ακόμα και με μεγάλη όρεξη /Difficulty gaining weight, even with large appetite	
• Νευρικός, συναισθηματικός, δεν μπορώ να δουλέψω κάτω από πίεση /Nervous, emotional, can't work under pressure	
• Εσωτερική δόνηση /Inward trembling	
• Εύκολη εκροή («κοκκίνισμα», «ξάναμμα»/Flush easily	
• Γρήγορος σφυγμός σε ξεκούραση /Fast pulse at rest	
• Δυσανεξία στις υψηλές θερμοκρασίες /Intolerance to high temperatures	
• Δυσκολία στο χάσιμο βάρους/Difficulty losing weight	
• Διανοητικά αργόστροφη, μειωμένη πρωτοβουλία /Mentally sluggish, reduced initiative	
• Κουράζεσαι εύκολα, νυσταγμένος κατά την διάρκεια της ημέρας /Easily fatigued, sleepy during the day	
• Ευαισθησία στο κρύο, κακό κυκλοφοριακό σύστημα (κρύα χέρια και πόδια) /Sensitive to cold, poor circulation (cold hands and feet)	
• Χρόνια δυσκοιλιότητα /Constipation, chronic	
• Υπερβολική τριχόπτωσης / ή χονδροειδής τρίχα /Excessive hair loss and / or coarse hair	
• Πρωινός πονοκέφαλος, ξεπερνιέται κατά την διάρκεια της ημέρας/ Morning headaches, wear off during the day	
• Απώλεια του 1/3 του πλευρικού του φρυδιού/ Loss of lateral 1/3 of eyebrow	
• Εποχιακή θλίψη /Seasonal sadness	

Παράγραφος 12 – Για άνδρες μόνο /Section 12 – Men Only

• Προβλήματα με τον προστάτη /Prostate problems	
• Δυσκολία στην ούρηση ή στην ροή /Urination difficult or dribbling	
• Δυσκολία να αρχίσει και να σταματήσει το ρεύμα των ούρων /Difficult to start and stop urine stream	
• Πόνος ή κάψιμο με την ούρηση /Pain or burning with urination	
• Ξυπνώ για να ουρήσω την νύχτα /Waking to urinate at night	
• Διακοπή της ροής κατά την διάρκεια της ούρησης /Interruption of stream during urination	
• Πόνος ανάμεσα στα πόδια /Pain on inside of legs or heels	
• Συναίσθημα της ελλιπούς εκκένωσης εντέρων /Feeling of incomplete bowel evacuation	
• Μειωμένη σεξουαλική λειτουργία /Decreased sexual function	

Παράγραφος 13 – Για Γυναίκες μόνο /Section 13 –Women Only

• Κατάθλιψη κατά την διάρκεια της περιόδου /Depression during periods	
• Ταλάντευση διάθεσης που συνδέεται με τις περιόδους (προεμμηνορροϊκό σύνδρομο –PMS)/Mood swings associated with periods (PMS)	
• Επιθυμία για σοκολάτα κατά την διάρκεια της περιόδου /Crave chocolate around periods	
• Διόγκωση του στήθους κατά την διάρκεια της περιόδου/ Breast associated with cycle	

• Υπερβολική εμμηνορροϊκή ροή /Excessive menstrual flow	
• Παραγγειακή ροή αίματος κατά τη διάρκεια των περιόδων/Scanty blood flow during periods	
• Περιοδική απώλεια έμμηνος ρήσης / Occasional skipped periods	
• Παραλλαγές στους εμμηνορροϊκούς κύκλους/Variations in menstrual cycles	
• Ενδομητρίωση /Endometriosis	
• Ινωματώδοις ιστοί στα μητρικά /Uterine fibroids	
• Ινωματώδοις ιστοί στήθους /Breast fibroids	
• Επίπονη επαφή /Painful intercourse (dyspareunia)	
• Κολπική απαλλαγή /Vaginal discharge	
• Κολπική ξηρότητα /Vaginal dryness	
• Κολπική φαγούρα/Vaginal itchiness	
• Παίρνεις βάρος γύρω από τα ισχία, τους μηρούς και τους γλουτούς/ Gain weight around hips, thighs and buttocks	
• Υπερβολική τριχοφυΐα στο πρόσωπο ή στο σώμα /Excess facial or body hair	
• Εξάψεις /Hot flashes	
• Ιδρώτας κατά την διάρκεια της νύκτας (στην εμμηνόπαυση) /Night sweats (in menopausal females)	
• Λεπτό δέρμα /Thinning skin	

Παράγραφος 14 – Καρδιαγγειακά /Section 14 - Cardiovascular

• Βαριά ή ακανόνιστη αναπνοή / Aware of heavy and / or irregular breathing	
• Ταλαιπωρία στα υψηλά ύψη /Discomfort at high altitudes	
• «Έλλειψη οξυγόνου» ή και συχνό χασμουρητό /Air hunger" and / or yawn frequently	
• Ανάγκη για να ανοιχτούν τα παράθυρα σε ένα κλειστό δωμάτιο/ Compelled to open windows in a closed room	
• Λιγότερη αναπνοή με την μέτρια άσκηση /Shortness of breath with moderate exertion	
• Πρησμένοι αστράγαλοι ειδικά στο τέλος της ημέρας /Ankles swell, especially at end of day	
• Βήχας τη νύχτα /Cough at night	
• Κοκκινίζετε ή έχετε εξάψεις χωρίς λόγο /Blush or face turns red for no reason	
• Πόνος ή συμπίεση στο στήθος ή /και επικεντρώνεται στο δεξί χέρι, χειροτερεύει με την άσκηση/ Dull pain or tightness in chest and / or radiate into right arm, worse with exertion	
• Κράμπες των μυών με την άσκηση /Muscle cramps with exertion	

Παράγραφος 15 – Νεφρά και Κύστες /Section 15 - Kidney and Bladder

• Πόνος στο μέσο της πλάτης /Pain in mid back region	
• Μαύροι κύκλοι κάτω από τα μάτια ή και φουσκωμένα μάτια /Dark circles under eyes and / or puffy eyes	
• Ιστορικό με πέτρες στα νεφρά (1=ναι, 0=όχι) /History of kidney stones (1 = yes, 0 = no)	

- Νεφελώδη, αιματηρά ή σκούρα ούρα/Cloudy, bloody or darkened urine
- Δυνατή οσμή των ούρων /Urine has a strong odor

Παράγραφος 16 – Ανοσοποιητικό σύστημα /Section 16 – Immune system

- Μύτη με τάση να τρέχει ή να στάζει /Runny or drippy nose
- Κρυολογώ στην αρχή του χειμώνα /Catch colds at the beginning of winter
- Βλέννα που παράγει βήχα /Mucus producing cough
- Συχνές μολύνσεις (αυτιά, κόλπο, πνεύμονα, δέρμα, κύστη, νεφρά) /Frequent infections (ear, sinus, lung, skin, bladder, kidney, etc.)
- Συχνό κρύωμα ή γρίπη /Frequent colds or flu
- Ποτέ δεν αρρωσταίνω (3 = όχι τα τελευταία 7 χρόνια., 2 = όχι τα τελευταία 4 χρόνια, 1 = όχι τα τελευταία 2 χρόνια) /Never get sick (3 = not in last 7 yrs., 2 = not in last 4 yrs., 1 = not in last 2 yrs.)
- Ακμή (ενηλικίωση) /Acne (adult)
- Φαγούρα στο δέρμα /Δερματίτιδα /Itchy skin / dermatitis
- Κύστες, εξανθήματα, σπυράκια/ Cysts, boils, rashes

Πάρτε μια βαθιά αναπνοή και συνεχίστε με τις ακόλουθες ερωτήσεις!!!
Take a deep breath an continue with the following questions!!

ΜΕΡΟΣ VI /PART VI

Η αξιολόγηση της διατροφής περιλαμβάνει την εξέταση τεσσάρων βασικών διατροφικών παραγόντων . /The assessment of nutrition involves looking at four key dietary factors:

1. Υγιεινές συνήθειες διατροφής: αναφέρονται στη διατροφική ισορροπία γενικά./ Prudent Diet habits referring to general nutritional balance.
2. Συνήθειες του ελέγχου θερμίδων που αναφέρονται στην απώλεια ή αύξηση βάρους. /Calorie Control habits pertaining to weight loss and gain.
3. Διατροφικό Λίπος/Χοληστερόλη αναφέρονται στις συνήθειες που επηρεάζουν το λίπος / χοληστερόλη στην διατροφή./Dietary Fat/Cholesterol referring to habits that affect fat/cholesterol in the diet.
4. Το Νάτριο ή ο Έλεγχος του Αλατιού επηρεάζει την αρτηριακή πίεση. /Sodium or Salt Control which affects blood pressure.

Και οι τέσσερις αυτοί διατροφικοί παράγοντες συσχετίζουν των διατροφή με την αύξηση του σωματικού βάρους και αυξάνει τους παράγοντες κινδύνου για τα κύρια προβλήματα υγείας (καρδιακές παθήσεις, διαβήτης, καρκίνος).

Απαντήστε στην κάθε ερώτηση σύμφωνα με διατροφικές σας συνήθειες. Τοποθετήστε τον αριθμό που αντιστοιχεί στην απάντηση σας στο διάστημα που υπάρχει αριστερά κάθε ερώτησης. Συμπληρώστε το σύνολο αυτών των αριθμών στο τέλος κάθε κατηγορίας.

All four of these dietary factors have an influence as to whether or not your diet contributes to high of body weight and increase risk factors for leading health problems (heart disease, diabetes, cancer). Fill out each of the four questionnaires below to get an idea of where you stand.

Answer each question according to your usual eating habits. Place the number corresponding to your answer in the space provided to the left of each question. Total these numbers at the end of each category.

Ερωτηματολόγιο Υγιεινής Διατροφής/Prudent Diet Questionnaire

17. Πόσα σε χαμηλή περιεκτικότητα λιπαρά ή αποβουτυρωμένο γάλα, γιαούρτι, και τυρί καταναλώνετε σε μια εβδομάδα. /How much low fat or skim milk, yogurt, and cheese do you consume in a week?

• Καταναλώνω τουλάχιστο 480γρ.(2φλ) γάλα ή γιαούρτι, ή 90γρ. (4 ½ φλ) τυρί ανά εβδομάδα /Consume at least 480g milk or yogurt, or 90g ounces cheese per week.	1
• 240γρ. (1φλ) γάλα/γιαούρτι ή 30γρ.(1 ½ φλ) τυρί ανά εβδομάδα /240g milk/yogurt or 30g cheese per week.	2
• Το χρησιμοποιώ μόνο στα δημητριακά ή το καταναλώνω περιστασιακά /Only use it in cereal or consume it occasionally.	3
• Δεν καταναλώνω καθόλου γάλα/γιαούρτι/τυρί /Do not consume milk/yogurt/cheese at all	4

18. Πόσο συχνά επιλέγετε να φάτε πατάτες τσίπ, τσίπ καλαμποκιού, ελιές, ξηρούς καρπούς ή παρόμοια τρόφιμα ως σνακ ή με το γεύμα; /How often do you choose to eat potato chips, corn chips, olives, nuts, or similar foods as snacks or with a meal?

• Καθόλου ή σπάνια /none or rarely	1
• Περιστασιακά 1-2 φορές την εβδομάδα /occasionally 1-2 times per week	2
• 3-4 φορές την βδομάδα /3-4 times per week	3
• 5 ή και περισσότερες φορές την βδομάδα /5 or more times per week	4

19. Πόσες μερίδες την ημέρα καταναλώνεις φρούτα; /How many servings do you eat fruit per day?

• 7 ή και περισσότερες /7 or more	1
• 4-6 φορές /4-6 times	2
• 1-3 φορές /1-3 times	3
• Καθόλου /none	4

20. Πόσες μερίδες ολοσίταρα ψωμιά, δημητριακά, και πιτυρούχα προϊόντα ή προϊόντα ολικής άλεσης τρώτε κάθε ημέρα; /How many servings whole grain breads and cereals, and bran products do you eat each day?

• Πέντε και περισσότερες /More than 4	1
• 3-4 μερίδες /3-4 servings	2
• 1-2 μερίδες /1-2 servings	3
• Καθόλου /none	4

21. Ποιο περιγράφει την διατροφή σας σε λαχανικά; /Which describes your consumption of vegetables?

• Τρώω ωμά λαχανικά στα ενδιάμεσα και λαχανικά/σαλάτες στο μεσημεριανό και βραδινό./ Snack on raw vegetables and eat vegetables/salads with lunch and dinner.	1
• Τρώω σαλάτα και λαχανικά σε ένα γεύμα καθημερινά /Eat salads and vegetables at one meal a day.	2
• Τρώω λαχανικά 2-3 φορές την βδομάδα. /Eat vegetables 2-3 times per week.	3
• Σπάνια τρώω λαχανικά./Rarely eat vegetables.	4

22. Πόσα ποτήρια νερό πίνεις την ημέρα? /How many glasses of water do you drink in a day?

• Εννέα και περισσότερα /Nine and more	1
• 5-8 ποτήρια /5-8 glasses	2
• 2-4 ποτήρια /2-4 glasses	3
• Ένα ποτήρι ή και καθόλου /one glass or none	4

23. Σκορ για το Ερωτηματολόγιο Υγιεινής Διατροφής /Total Prudent Diet Questionnaire

Ερωτηματολόγιο για έλεγχο θερμίδων /Calorie Control Questionnaire

24. Ποια είναι η ποιο κοντινή περιγραφή για την ποσότητα του φαγητού που καταναλώνετε; /Which most closely describes the amount of food you eat at one time?

• Διαλέγω μία λογική μερίδα, σταματώ να τρώω όταν χορτάσω. /Select a reasonable portion, stop eating when full.	1
• Τρώω ότι σερβίρετε και καθαρίζω το πιάτο μου /Eat what is served and clean the plate.	2
• Τρώω επιπρόσθετη μερίδα για να ικανοποιήσω την γεύση /Eat additional helpings to satisfy taste.	3
• Τρώω μέχρι να χορτάσω και μετά τρώω επιδόρπιο /Eat until full and then eat desserts.	4

25. Αν θέλατε να μειώσετε τις θερμίδες που παίρνετε, τι θα κάνατε; /If you wanted to decrease caloric intake, which would you do:

• Περιορισμός στο κρέας, τις σάλτσες κρέμας, τους ζωμούς, τα επιδόρπια, τις σάλτσες σαλάτας. /Cut down on meat, cream sauces, gravy, desserts, salad dressings.	1
• Περιορισμό στο μέγεθος της μερίδας /Limit portion sizes.	2
• Θα σταματούσα το ψωμί και τις πατάτες /Leave off bread and potatoes.	3

• Να ακολουθήσω μια δίαιτα λιμοκτονίας για λίγες μέρες /Follow a crash diet for a few days	4

26. Πόσα οινοπνευματώδη ποτά καταναλώνετε; /How many alcoholic beverages do you consume?

• Σπάνια ή ποτέ δεν πίνω. /Rarely or never drink.	1
• 1-3 ποτά την εβδομάδα /1-3 drinks per week	2
• 1-2 ποτά την ημέρα /1-2 drinks per day	3
• 3 ή και περισσότερα ποτά τα Σαββατοκύριακα /3 or more drinks on weekend days	4

27. Τρώτε πάντα τόσο όσο να είσαστε τόσο γεμάτοι που να νιώθετε άβολα; /Do you ever eat until you are so full that you are uncomfortable?

• Σπάνια ή σε ξεχωριστές περιπτώσεις /Rarely or on special occasions	1
• 1-2 φορές τον μήνα /1-2 times a month	2
• Μία φορά την εβδομάδα /once a week	3
• Κάθε λίγες μέρες ή περισσότερο /every couple of days, or more	4

28. Πόσα γλυκά (καραμέλα, μπισκότα, επιδόρπια, παγωτά, ποτά με βάση τη ζάχαρη) καταναλώνετε; /How many sweets (candy, pastry, cookies, desserts, ice cream, sugar-based beverages) do you eat?

• Μόνο σε ξεχωριστές περιπτώσεις ή δεν τρώω καθόλου γλυκά /only on special occasions or don't eat sweets	1
• 1-2 μερίδες την ημέρα /1-2 servings per day	2
• 3-4 μερίδες την ημέρα /3-4 servings per day	3
• 5 ή και περισσότερες μερίδες την ημέρα /5 or more servings per day	4

29. Ποιο σχέδιο διατροφής απεικονίζει τον τρόπο κατανάλωσης της τροφής σας;/ Which pattern of eating typifies your style?

• Κανονικά γεύματα ανά τακτικά διαστήματα /Regular meals at frequent intervals.	1
• Αποφεύγοντας ένα γεύμα περιστασιακά /Occasionally skipping a meal	2
• Αποφεύγοντας το πρόγευμα ή το μεσημεριανό /Skipping breakfast or lunch	3
• Αποφεύγοντας γεύματα κατά την διάρκεια της ημέρας και τρώω μόνο τα βραδινά γεύματα /Skipping meals during the day and eating only the evening meal.	4

30. Σκορ για το ερωτηματολόγιο ελέγχου θερμίδων/Total of Calorie Control Questionnaire	

Ερωτηματολόγιο για έλεγχο του Λίπους/Χοληστερόλης

/Fat/Cholesterol Control Questionnaire

31. Πόσο συχνά καταναλώνετε αυγά στο πρόγευμα ή σε άλλο γεύμα /How often do you eat eggs for breakfast or another meal?

• Μία φορά την βδομάδα ή καθόλου /once per week or none	1
• 2-3 φορές την βδομάδα /2-3 times per week	2
• 4-6 φορές την βδομάδα /4-6 times per week	3
• 7 ή και περισσότερες φορές την εβδομάδα /7 or more times per week	4

32. Πόσες φορές την εβδομάδα καταναλώνεις κόκκινο κρέας (βοδινό, μπριζόλα, χοιρινό, μπέικον, αρνί παιδάκια); /How many times per week do you consume red meat (beef, steak, pork, bacon, lamb, ribs)?

• Δεν καταναλωνω κοκκινο κρεας/do not consume red meat	1
• <=2 φορές /<=2 times	2
• 3-4 φορές /3-4 times	3
• 5-6 και περισσότερες φορές/>=5-6 times	4

33. Όταν προετοιμάζετε ή τρώτε πουλερικά (κοτόπουλο, γαλοπούλα) ποιο από τα ακόλουθα σχέδια ακολουθείτε περισσότερο; /When you prepare or eat poultry (chicken, turkey) which of the following plans do you most closely follow:

• Διαλέγω το άσπρο κρέας, αφαιρώ το δέρμα και το προετοιμάζω ψητό ή στην σχάρα./ Chose white meat, remove skin and prepare by baking or broiling.	1
• Διαλέγω το σκούρο κρέας, αφαιρώ το δέρμα και ψήνω στον φούρνο ή στην σχάρα. /Chose dark meat, skin removed, and bake or broil	2
• Ψητό ή σχάρας, με το δέρμα και με σάλτσα κρέατος /Bake or broil, skin on and serve with gravy	3
• Τηγανιτό με το δέρμα /Leave the skin on and fry	4
• Δεν τρωω κοτόπουλο /I don't eat chicken	

34. Όταν επιλέγεις σαλάτα ή σάντουιτς, ποια από τις ακόλουθες «γεμίσεις», διαλέγεις ποιο συχνά; /When selecting a salad or sandwich, which of the following "fillings" would you chose most often?

• Άπαχο τυρί ή χαλούμι (≤12% λιπαρά) ή φασόλια / Low fat cheese (≤12% fat) or beans.	1
• γαλοπούλα, κοτόπουλο, τόνο, άπαχα κομμάτια κρέατος /turkey, chicken, tuna, lean cuts of meats	2
• κάποια από τα ποιο πάνω με τυρί /same as above with cheese	3

• Χαμ, μουρτατέλα, χάμπουργκερ, σαλάμι, λουκάνικα, μπέικον με κρεμώδες ή σκληρό τυρί /ham, pastrami, hamburger, salami, sausages, bacon, with cream or hard cheese	4

35. Όταν τρως γαλακτοκομικά προϊόντα (γάλα, γιαούρτι, παγωτά, τυρί) διαλέγεις: /When you eat dairy products (milk, yogurt, ice cream, cheese) do you select:

• Μόνο άπαχα ή 0.5% προϊόντα /Only skim or 0.5% products	1
• Μόνο τα χαμηλά σε λιπαρά προϊόντα με 1-2% λίπος /only look for low-fat products 1-2%fat	2
• Διαλέγω κανονικό παγωτό και γιαούρτι, αλλά χρησιμοποιώ γάλα χαμηλό σε λιπαρά /Choose regular ice cream and yogurt, but use lowfat milk	3
• Διαλέγω μόνο ολόπαχα γαλακτοκομικά προϊόντα /Only chose whole fat content dairy products.	4

36. Αν θα φας πατάτες διαλέγεις: /If you were having potatoes would you choose:

• Βρασμένες ή ψητές χωρίς την προσθήκη λίπους (βούτυρο, μαργαρίνη, κρέμα) /boiled or baked with no added fat (butter, margarine, sour cream)	1
• Βρασμένες ή ψητές με πολυακόρεστη μαργαρίνη /γιαούρτι /boiled or baked with polyunsaturated margarine/yogurt	2
• βρασμένες ή ψητές με μαργαρίνη /βούτυρο και κρέμα /boiled or baked with	3

margarie/butter and sour cream	
• Τηγανιτές, αντιναχτές /french fried, hash browns	4

37. Σκορ για το Ερωτηματολόγιο ελέγχου Λίπους/Χοληστερόλης /Total Fat/Cholesterol Control Questionnaire	

Ερωτηματολόγιο για έλεγχο Νατρίου/Αλατιού /Sodium/Salt Control Questionnaire

38. Πόσο συχνά προσθέτεις αλάτι στο φαγητό σου μετά που θα σερβιριστεί στο τραπέζι; /How frequently do you add salt to your food after it is served at the table?

• Ποτέ /Never	1
• 1-2 φορές την εβδομάδα /1-2 times per week	2
• Μία φορά την ημέρα /about once a day	3
• Σχεδόν με όλα τα γεύματα /with almost all meals	4

39. Πόσο συχνά τρώτε σε ταχυφαγεία; /How many times do you eat at a "fast food" restaurant?

• Σπάνια ή πάντα διαλέγω γεύματα από μπαρ με σαλάτες /rarely or always selecting a "salad bar" meal	1

• μία φορά την εβδομάδα /once a week	2
• 2-3 φορές την εβδομάδα /2-3 times per week	3
• 4 ή και περισσότερες φορές την εβδομάδα /4 or more times per week	4

40. Πόσο συχνά τρως κάποιο από τα ακόλουθα φαγητά: χοτ ντογκ, λουκάνικα, αλλαντικά, μπέικον, λούντζα, ρόστο; /How often do you eat any of the following foods: hot dogs, luncheon meat, bacon, ham, sausage, loutza, roast beef?

• Σπάνια ή ποτέ /rarely or never	1
• 1-2 φορές την εβδομάδα /1-2 times per week	2
• 3-4 φορές την εβδομάδα /3-4 times per week	3
• Καθημερινά /daily	4

41. Σε ποια μορφή αγοράζεις τρόφιμα ή γεύματα ποιο συχνά; /In what form do you most frequently purchase food or meal preparations?

• Φρέσκα /fresh	1
• κονσερβοποιημένα ή κατεψυγμένα χωρίς αλάτι /canned or frozen without salt	2
• κονσερβοποιημένα χωρίς σάλτσες /canned without sauces	3

• κονσερβοποιημένα, κατεψυγμένα ή αποξηραμένα με σάλτσες ή και καρυκεύματα /canned, frozen, or dry with sauces and/or seasonings	4

42. Όταν προετοιμάζεις γεύματα ή όταν τρως έξω, πόσο συχνά προσθέτεις κάποιο ή όλα από τα ακόλουθα στο φαγητό σου; Μουστάρδα, τουρσί, relish, σάλτσα σόγιας, κέτσαπ, ενισχυτικό κρέατος, γλουταμικό μονονάτριο (MSG)? /While preparing meals or when eating out, how frequently do you add any or all of the following items to your food? mustard, pickles, relish, soy sauce, ketchup, meat tenderizer, MSG?

• Σπάνια ή ποτέ /rarely or never	1
• 1-2 φορές την εβδομάδα /1-2 times per week	2
• 3-4 φορές την εβδομάδα /3-4 times per week	3
• Καθημερινά /daily	4

43. Σκορ για το Ερωτηματολόγιο ελέγχου νατρίου/αλατιού /Total Sodium/Salt Control Questionnaire	

Αξιολόγηση και υποβολή ερωτηματολογίων /Questionnaire Evaluation and Submission

Σύνολο αποτελεσμάτων για τα ερωτηματολόγια /Scoring results for the questionnaires

• Άριστα = 6-8 βαθμοί /Excellent = 6-8 points	
• Αρκετά καλά = 9-12 βαθμοί /Good = 9-12 points	
• Καλά=13-16/Fair = 13-16 points	
• Φτωχό = 17-20 βαθμοί /Poor = 17-20 points	
• Πολύ φτωχό = 21-24 βαθμοί /Very poor = 21-24 points	

Συμπληρώστε, και επιστρέψετε στους ερευνητές τα αποτελέσματα των ερωτηματολογίων σας χρησιμοποιώντας τον ακόλουθο τρόπο:

Complete, and return to researchers your questionnaire results using the following format:

• **Σκορ ερωτηματολογίου για Υγιεινή Διατροφή =** Score of Prudent Diet Questionnaire =	
• **Σκορ ερωτηματολογίου για έλεγχο των θερμίδων =** Score of Calorie Control Questionnaire =	
• **Σκορ ερωτηματολογίου για έλεγχο του βάρους =** Score of Fat Control Questionnaire =	
• **Σκορ ερωτηματολογίου για έλεγχο του νατρίου/αλατιού =** Score of Sodium/Salt Control Questionnaire =	

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

LONG LAST 7 DAYS SELF-ADMINISTERED FORMAT

FOR USE WITH YOUNG AND MIDDLE-AGED ADULTS (15-69 years)

The International Physical Activity Questionnaires (IPAQ) comprises a set of 4 questionnaires. Long (5 activity domains asked independently) version for use by either telephone or self-administered methods are available. The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health–related physical activity.

Background on IPAQ

The development of an international measure for physical activity commenced in Geneva in 1998 and was followed by extensive reliability and validity testing undertaken across 12 countries (14 sites) during 2000. The final results suggest that these measures have acceptable measurement properties for use in many settings and in different languages, and are suitable for national population-based prevalence studies of participation in physical activity.

Using IPAQ

Use of the IPAQ instruments for monitoring and research purposes is encouraged. It is recommended that no changes be made to the order or wording of the questions as this will affect the psychometric properties of the instruments.

ΔΙΕΘΝΗΣ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ ΓΙΑ ΤΗΝ ΦΥΣΙΚΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

Ενδιαφερόμαστε να ερευνήσουμε για τα είδη φυσικής δραστηριότητας που κάνουν οι άνθρωποι στην καθημερινότητα τους. Οι ακόλουθες ερωτήσεις είναι σχετικές με την φυσική δραστηριότητα σας τις **τελευταίες 7 ημέρες**. Παρακαλώ απαντήστε σε όλες τις ερωτήσεις αν και πιστεύετε ότι δεν είστε καθόλου δραστήριοι. Παρακαλώ σκεφτείτε τις δραστηριότητες που κάνετε στην εργασία ή στο σπίτι ή στον κήπο (αυλή) ή να μεταβείς από μέρος σε μέρος στον ελεύθερο σας χρόνο για αναψυχή, άσκηση και αθλητισμό.

Σκεφτείτε όλες τις **έντονες** και **μέτριες** δραστηριότητες που κάνατε τις **τελευταίες 7 ημέρες**. **Έντονη** φυσική δραστηριότητα αναφέρεται στις δραστηριότητες που απαιτούν έντονη προσπάθεια και σε κάνουν να αναπνέεις πολύ έντονα. **Μέτρια** φυσική δραστηριότητα αναφέρεται σε δραστηριότητες που η προσπάθεια είναι περισσότερη από την κανονική.

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

ΜΕΡΟΣ 1: ΦΥΣΙΚΕΣ ΔΡΣΤΗΡΙΟΤΗΤΕΣ ΠΟΥ ΕΧΟΥΝ ΣΧΕΣΗ ΜΕ ΤΗΝ ΕΡΓΑΣΙΑ / PART 1: JOB-RELATED PHYSICAL ACTIVITY

Το πρώτο μέρος αναφέρεται στην εργασία σας. Αυτό περιλαμβάνει πληρωμένη εργασία, καλλιέργεια, εθελοντική εργασία, διάβασμα και οτιδήποτε άλλη απλήρωτη εργασία που κάνατε εκτός σπιτιού. /The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1. Εργάζεστε τώρα ή κάνετε οποιαδήποτε άλλη απλήρωτη εργασία εκτός σπιτιού? / Do you currently have a job or do any unpaid work outside your home?

☐ Ναι /Yes

☐ Όχι /No → ***Αν απαντήσετε Όχι μεταφερθείτε στο ΜΕΡΟΣ 2 Skip to PART 2: TRANSPORTATION***

Οι επόμενες ερωτήσεις αναφέρονται στις φυσικές δραστηριότητες που κάνετε τις **τελευταίες 7 ημέρες** στην εργασία σας ή σε εθελοντικές εργασίες. /The next questions are about all the physical activity you did in the **last 7 days** as part of your paid or unpaid work. This does not include traveling to and from work.

2. Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσες μέρες κάνετε **έντονη** φυσική δραστηριότητα όπως ανασήκωση βαριών αντικειμένων, σκάλισμα, βαριά κατασκευή ή ανεβοκατέβασμα σκάλων **ως μέρος της εργασία σας**? Σκεφτείτε μόνο τις φυσικές δραστηριότητες που κάνετε για τουλάχιστον 10 συνεχόμενα λεπτά την φορά. /During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you did for at least 10 minutes at a time.

____ **ημέρες/εβδομάδα /days per week**

☐ Καθόλου έντονη φυσική δραστηριότητα στην εργασία → **Μεταφερθείτε στην**

No vigorous job-related physical activity **ερώτηση 4**

Skip to question 4

3. Πόσο χρονικό διάστημα συνήθως ξοδεύεις σε μία από εκείνες τις μέρες σε **έντονη** φυσική δραστηριότητα ως μέρος της εργασίας σας?/How much time did you usually spend on one of those days doing **vigorous** physical activities as part of your work?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

4. Ξανασκεφτείτε για μόνο εκείνες τις φυσικές δραστηριότητες που κάνετε για τουλάχιστον 10 λεπτά την φορά. Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσες μέρες κάνετε **μέτρια** δραστηριότητα όπως μεταφορά ελαφριών αντικειμένων **ως μέρος της εργασίας σου**? Μην περιλάβεις το περπάτημα. / Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads **as part of your work**? Please do not include walking.

_____ **ημέρες/ εβδομάδα / days per week**

☐ Καθόλου μέτρια δραστηριότητα στην εργασία → ***Αν Απαντήσετε ΟΧΙ μεταφερθείτε στην ερώτηση 6***

moderate job-related physical activity

Skip to question 6

5. Πόσο χρόνο ξοδεύεις συνήθως σε εκείνες τις μέρες κάνοντας **μέτρια** φυσική δραστηριότητα? / How much time did you usually spend on one of those days doing **moderate** physical activities as part of your work?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

6. Κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες ημέρες κάνετε **περπάτημα** για τουλάχιστον 10 συνεχόμενα λεπτά την φορά ως μέρος της δουλειάς σας? Παρακαλώ μην περιλάβετε το περπάτημα που ξοδέψατε περπατώντας προς την δουλειά σας? / During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **as part of your work**? Please do not count any walking you did to travel to or from work.

_____ **ημέρες/εβδομάδα /days per week**

☐ No job-related walking → ***Skip to PART 2: TRANSPORTATION***

7. Πόσο χρόνο συνήθως ξοδεύεις σε μία από εκείνες τις ημέρες περπατώντας ως μέρος την δουλειά σας?/ How much time did you usually spend on one of those days **walking** as part of your work?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

ΜΕΡΟΣ 2: ΜΕΤΑΦΟΡΑ ΚΑΙ ΦΥΣΙΚΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ / PART 2: TRANSPORTATION PHYSICAL ACTIVITY

Αυτές οι ερωτήσεις είναι για το πώς μεταφέρεστε από μέρος σε μέρος όπως δουλειά, καταστήματα, σινεμά και άλλα /These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

8. κατά την διάρκεια των τελευταίων 7 ημερών πόσες ημέρες ταξιδέψατε με μηχανοκίνητο όπως τρένο, λεωφορείο, αυτοκίνητο ή με μοτοποδήλατο /During the **last 7 days**, on how many days did you **travel in a motor vehicle** like a train, bus, car, or tram?

_____ **ημέρες/εβδομάδα /days per week**

☐ Καθόλου μεταφορά με μηχανοκίνητο → ***Μεταφερθείτε στην ερώτηση 10***

No traveling in a motor vehicle ***Skip to question 10***

9. Πόσο χρόνο συνήθως ξοδεύετε σε μία από εκείνες τις ημέρες ταξιδεύοντας με τρένο, λεωφορείο, αυτοκίνητο, μοτοποδήλατα ή μηχανοκίνητο? /How much time did you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

Τώρα σκεφτείτε μόνο την ποδηλασία και περπάτημα που μπορεί να κάνετε ταξιδεύοντας για να κάνετε εργασίες της δουλειάς και να μεταφερθείτε από μέρος σε μέρος? /Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.

10. Κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες ημέρες κάνατε **ποδηλασία** ή **περπάτημα** για τουλάχιστον 10 λεπτά για να μεταφερθείτε από μέρος σε μέρος? / During the **last 7 days**, on how many days did you **bicycle** for at least 10 minutes at a time to go **from place to place**?

_____ **ημέρες/εβδομάδα /days per week**

☐ Καθόλου ποδηλασία → **Μεταφερθείτε στην ερώτηση 12**

από μέρος σε μέρος ***Skip to question 12***

No bicycling from place to place

11. Πόσο χρονικό διάστημα συνήθως ξοδεύετε σε μία από εκείνες τις ημέρες για να μεταφερθείτε με **ποδηλασία** από ένα τόπο σε άλλο?/ How much time did you usually spend on one of those days to **bicycle** from place to place?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

12. Κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες ημέρες **περπάτησε** τουλάχιστον 10 λεπτά την φορά για να μεταφερθείτε **από το ένα μέρος στο άλλο?/** During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go **from place to place**?

_____ **ημέρες/εβδομάδα /days per week**

☐ Καθόλου περπάτημα από το ένα μέρος στον άλλο

No walking form place to place

→ ***Αν απαντήσετε καθόλου πηγαίνετε το ΜΕΡΟΣ 3 – Οικιακά, Συντήρηση σπιτιών και φροντίδα της οικογένειας.***

Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

13. Πόσο χρονικό διάστημα συνήθως ξοδεύετε σε μία από εκείνες τις ημέρες σε περπάτημα για να μεταφερθείτε από το ένα μέρος στο άλλα./ How much time did you usually spend on one of those days walking from place to place?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

ΜΕΡΟΣ 3 – Οικιακά, Συντήρηση σπιτιών και φροντίδα της οικογένειας.

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

Το μέρος αυτό αναφέρεται στις φυσικές δραστηριότητες που έχετε κάνει τις **τελευταίες 7 ημέρες** στο σπίτι και στην αυλή του σπιτιού, όπως οικιακά, κηπουρική, συντήρηση σπιτιού και την φροντίδα της οικογένειας. /This section is about some of the physical activities you might have done in the **last 7 days** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14. Σκεφτείτε μόνο εκείνες τις φυσικές δραστηριότητες που κάνατε για τουλάχιστον 10 συνεχόμενα λεπτά. Κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες ημέρες κάντε **έντονη** φυσική δραστηριότητα όπως βαριά μετακίνηση αντικειμένων, τεμαχίζοντας ξύλα, μετακινώντας χώμα με φτυάρι, σκάβοντας στον κήπο?/ Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging **in the garden or yard**?

_____ **ημέρες/εβδομάδα/ days per week**

☐ Καθόλου έντονη φυσική δραστηριότητα στον κήπο → **Μεταφερθείτε στην ερώτηση 16**

No vigorous activity in garden or yard

Skip to question 16

15. Πόσο χρονικό διάστημα συνήθως ξοδέψατε εκείνες τις μέρες κάνοντας **έντονη** δραστηριότητα στον κήπο ή αυλή του σπιτιού? /How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

16. Ξανασκεφτείτε μόνο τις φυσικές δραστηριότητες που κάνατε για τουλάχιστον 10 λεπτά κάθε φορά. Κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες μέρες κάνατε **μέτρια** δραστηριότητα όπως μεταφορά ελαφριών φορτίων, σκούπισμα, πλένοντας παράθυρα και την εκκαθάριση στον κήπο./ Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

_____ **ημέρες/εβδομάδα /days per week**

☐ Καθόλου μέτρια δραστηριότητα στον κήπο ή στην αυλή. → ***Μεταφερθείτε στην ερώτηση 18.***

No moderate activity in garden or yard ***Skip to question 18***

17. Πόσο χρόνο συνήθως ξοδέψατε σε μία από εκείνες τις ημέρες κάνοντας **μέτρια φυσική** δραστηριότητα στον κήπο ή την αυλή σας? /How much time did you usually spend on one of those days doing **moderate** physical activities in the garden or yard?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

18. Ακόμη μία φορά, σκεφτείτε μόνο την φυσική δραστηριότητα που έκανες για τουλάχιστον 10 λεπτά κάθε φορά. Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσες ημέρες κάνατε **μέτρια** φυσική δραστηριότητα όπως να μεταφέρεις ελαφριά βάρη, να πλένεις παράθυρα, να τρίβεις το πάτωμα ή να σκουπίζεις μέσα στο σπίτι? /Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

_____ **ημέρες/εβδομάδα /days per week**

☐ Καθόλου μέτρια φυσική δραστηριότητα μέσα στο *σπίτι* → ***Μεταφερθείτε στο ΜΕΡΟΣ 4: ΑΘΛΗΜΑ και ΦΥΣΙΚΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ στον ΧΡΟΝΟ ΔΙΑΣΚΕΔΑΣΗ***

No moderate activity inside home → ***Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY***

19. Πόσο χρόνο συνήθως ξοδεύετε σε μία από εκείνες τις ημέρες κάνοντας **μέτρια** φυσική δραστηριότητα μέσα στο σπίτι? /How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

ΜΕΡΟΣ 4: ΑΝΑΨΥΧΗ, ΑΘΛΗΜΑ ΚΑΙ ΦΥΣΙΚΗ ΔΡΑΣΤΗΙΟΤΗΤΑ ΣΤΟΝ ΧΡΟΝΟ ΔΙΑΣΚΕΔΑΣΗΣ /PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

Αυτό το μέρος είναι όλο για την φυσική δραστηριότητα που έκανες τις **τελευταίες 7 ημέρες** ως μέρος την αναψυχής σας, ως άθλημα ή ως μέρος της διασκέδασης σας?/This section is about all the physical activities that you did in the **last 7 days** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Μην υπολογίσετε καθόλου οποιοδήποτε περπάτημα έχεις ήδη αναφέρει, κατά την διάρκεια των **τελευταίων 7 ημερών** πόσες μέρες έκανες περπάτημα για τουλάχιστον 10 λεπτά συνεχόμενα την φορά στον χρόνο διασκέδασης σου?/ Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

_____ **ημέρες/εβδομάδα /days per week**

☐ Καθόλου Περπάτημα στον χρόνο διασκέδασης → **Μεταφερθείτε στην ερώτηση 22**

No walking in leisure time ***Skip to question 22***

21. Πόσο χρόνο συνήθως ξοδέψατε σε μία από εκείνες τις μέρες για **περπάτημα** στον χρόνο διασκέδασης σας?/ How much time did you usually spend on one of those days **walking** in your leisure time?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

22. Σκεφτείτε μόνο εκείνες τις φυσικές δραστηριότητες που κάνατε για τουλάχιστον 10 λεπτά κάθε φορά. Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσες μέρες κάνετε **έντονη** φυσική δραστηριότητα όπως αεροβική, τρέξιμο, γρήγορη ποδηλασία ή γρήγορη κολύμβηση **στον χρόνο διασκέδασης σας;/** Think about only those physical activities that you did for at least 10 minutes at a

time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

_____ **ημέρες/εβδομάδα /days per week**

☐ Καθόλου έντονη δραστηριότητα στον χρόνο διασκέδασης → **Μεταφερθείτε στη**

No vigorous activity in leisure time **ερώτηση 24**

Skip to question 24

23. Πόσο χρόνο συνήθως ξοδέψατε σε μία από εκείνες τις μέρες κάνοντας **έντονη** φυσική δραστηριότητα στον χρόνο διασκέδασης σας?/ How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

24. Ξανά σκεφτείτε μόνο εκείνες τις φυσικές δραστηριότητες που κάνατε για τουλάχιστον 10 συνεχόμενα λεπτά την φορά. Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσες ημέρες κάνατε **μέτρια** φυσική δραστηριότητα όπως ποδηλασία σε κανονικό ρυθμό, κολύμπι σε κανονικό ρυθμό και διπλή αντισφαίριση στον χρόνο διασκέδασης σας?/ Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

_____ **ημέρες/εβδομάδα /days per week**

☐ Καθόλου δραστηριότητα στον χρόνο διασκέδασης σας → ***Μεταφερθείτε στο***

No moderate activity in leisure time ***ΜΕΡΟΣ 5: ΧΡΟΝΟΣ ΚΑΘΙΣΤΙΚΗΣ ΖΩΗΣ***

Skip to PART 5: TIMESPENT SITTING

25. Πόσο χρονικό διάστημα συνήθως ξοδέψατε σε μία από εκείνες τις μέρες κάνοντας **μέτρια** φυσική δραστηριότητα στον χρόνο διασκέδασης σας?/ How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

ΜΕΡΟΣ 5: ΧΡΟΝΟΣ ΚΑΘΙΣΤΙΚΗΣ ΖΩΗΣ /*PART 5: TIME SPENT SITTING*

Η τελευταία ερώτηση αναφέρεται στον χρόνο που ξοδέψατε κάνοντας καθιστική εργασία στην δουλειά, στο σπίτι, στο διάβασμα ή στον χρόνο διασκέδασης σας?/ The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

26. Κατά την διάρκεια των **τελευταίων 7 ημερών**, πόσο χρόνο ξοδέψατε **καθισμένοι** την εβδομάδα (εκτός Σαββατοκύριακο) /During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

27. Κατά την διάρκεια **των τελευταίων 7 ημερών** πόσο χρόνο συνήθως ξοδέψατε καθισμένοι το Σαββατοκύριακο?/ During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

_____ **ώρες/ημέρα /hours per day**

_____ **λεπτά/ημέρα /minutes per day**

Αυτό είναι το τέλος του ερωτηματολόγιου, σας ευχαριστούμε για την συμμετοχή σας. /This is the end of the questionnaire, thank you for participating.

Name_____

Date_____ **Date of birth**_____ **Section** _____

Gender:

Male	
Female	

Checklist A - Identify your eating habits

- For each question, select the answer that best reflects your diet. If you select more than one answer, the score will be averaged by adding the individual scores and dividing by the number of answers you selected.
- Keep the quiz as incentive. The quiz will be repeated on the 1st week, 18th week and 36th week.

1. How many times a week do you eat red meat? (Include beef, lamb, pork, veal.)
    a. 0
    b. 1 or 2
    c. 3 or 4
    d. 5 or 6
    e. More than 6

2. How many ounces of red meat constitute your normal portion? (Hint: 3 ounces (or 90gr), cooked, is approximately the size of a deck of cards.)
    a. 3 ounces
    b. 4 ounces
    c. 5 ounces

d. 6 or more ounces

3. What kind of red meat do you usually choose?
    a. Loin or round cuts only
    b. 80% lean
    c. Ribs, T-bon
    d. Hot dogs, bacon, bologna

4. How many times a week do you eat seafood? (Omit fried dishes; include shellfish like shrimp and lobster.)
    a. 2 or more
    b. 1
    c. Less than 1
    d. Never

5. How many ounces of poultry or seafood do you eat for a serving? (Do not count fried items.)
    a. 3 ounces
    b. 4 ounces
    c. 5 ounces
    d. 6 or more ounces

6. Do you remove the skin from poultry?
    a. Yes
    b. Don't eat poultry
    c. No

7. How many times a week do you eat at least one half-cup serving of legumes? (Include beans like soybeans, navy, kidney, garbanzo, baked beans, lentils.)
    a. 3 or more
    b. 1 or 2
    c. Less than 1

d. Never eat legumes

8. What kind of milk do you drink?
    a. Skim or 1%
    b. Don't drink milk
    c. 2%
    d. Whole

9. What kind of cheese do you usually eat?
    a. Fat-free
    b. Lowfat (5 grams fat or less per ounce)
    c. Don't eat cheese
    d. Whole milk cheese

10. How many servings of low-fat, high-calcium foods do you eat daily? (One cup of yogurt or milk, 2 ounces of cheese, or one cup chopped broccoli, kale, or greens count as a serving.)
    a. 3 or more
    b. 1 or 2
    c. 0

11. What kind of bread do you eat most often?
    a. 100% whole wheat
    b. Whole grain
    c. White, "wheat," Italian or French
    d. Croissant or biscuit

12. Which is part of your most typical breakfast?
    a. High-fiber cereal and fruit
    b. Roll or toast
    c. Don't eat breakfast

d. Danish, pastry, or doughnut

13. What kind of sauce or topping is usually on the pasta you eat?
    a. Vegetables tossed lightly with olive oil
    b. Tomato or marinara sauce
    c. Meat sauce
    d. Alfredo or cream sauce

14. Which would you be most likely to order at a Chinese restaurant?
    a. Chicken with steamed vegetables over white rice
    b. Cold sesame noodles
    c. Twice-fried pork /beef
    d. Sizzly shrimps

15. Which would you be most likely to choose as toppings for pizza?
    a. Vegetables (e. g., broccoli, peppers)
    b. Plain cheese
    c. Extra cheese
    d. Sausage and pepperoni

16. What is the most typical snack for you?
    a. Fresh fruit
    b. Lowfat yogurt
    c. Crackers or Rusks
    d. Potato chips
    e. Candry bar

17. How many half-cup servings of a high vitamin C fruit or vegetable do you eat daily? (Include citrus fruit and juices, kiwi, papaya, strawberries, broccoli, peppers, potatoes, tomatoes.)
    a. 2 or more
    b. 1

c. None

18. How many half-cup servings of a high vitamin A fruit or vegetable do you eat daily? (Include apricots, cantaloupe, mango, broccoli, carrots, greens, spinach, sweet potato, winter squash.)
    a. 2 or more
    b. 1
    c. None

19. What kind of salad dressing do you most often choose?
    a. Fat-free or low-fat
    b. Lemon juice or herb vinegar
    c. Olive or canola oil-based
    d. Creamy or cheese-based

20. What do you usually spread on bread, rolls, or bagels?
    a. Nothing
    b. Jam, jelly, or honey
    c. Light butter or light margarine
    d. Margarine
    e. Butter

21. What spread do you usually choose for sandwiches?
    a. Nothing
    b. Mustard
    c. Light mayonnaise
    d. Mayonnaise, margarine, or butter

22. Which frozen dessert do you usually choose?
    a. Don't eat frozen desserts
    b. Fat-free frozen yogurt
    c. Sorbet or sherbet

d. Light ice cream
e. Ice cream

23. How many cups of caffeinated beverages (e. g., coffee, tea, or soda) do you usually drink in a typical day?
    a. None
    b. 1 to 2
    c. 3 or 4
    d. 5 or more

24. How many total cups of fluid do you drink in a typical day? (Include water, juice, milk.)
    a. 8 or more
    b. 6 to 7
    c. 4 or 5
    d. Less than 4

25. What kind of cereal do you eat?
    a. High-fiber cereals such as bran flakes
    b. Low-fiber, low-sugar cereals, such as puffed rice, corn flakes, Corn Chex, or Cheerios.
    c. Sugary, low-fiber cereals, like Frosted Flakes, or fruit-flavored cereals
    d. Regular (high-fat) granola

26. How many times a week do you eat fried foods?
    a. never
    b. 2 or less
    c. 3 or more

27. How many times a week do you eat cancer-fighting cruciferous vegetables? (Include broc-coli, cauliflower, brussels sprouts, cabbage, kale, bok choy, cooking greens, turnips, rutabaga.)

a. 3 or more
b. 1 to 2
c. Rarely
d. None

Calculate Your Score:

1	(a)	+4	**2**	(a)	+2	**3**	(a)	+2	**4**	(a)	+4	**5**	(a)	+2
	(b)	+2		(b)	+1		(b)	+1		(b)	+2		(b)	+1
	(c)	-2		(c)	-2		(c)	-4		(c)	0		(c)	-2
	(d)	-4		(d)	-3		(d)	-5		(d)	-3		(d)	-3
	(e)	-5												

6	(a)	+2	**7**	(a)	+4	**8**	(a)	+3	**9**	(a)	+2	**10**	(a)	+4
	(b)	0		(b)	+2		(b)	0		(b)	+1		(b)	+2
	(c)	-3		(c)	0		(c)	-3		(c)	0		(c)	-3
				(d)	-1		(d)	-4		(d)	-4			

11	(a)	+4	**12**	(a)	+4	**13**	(a)	+3	**14**	(a)	+3	**15**	(a)	+3
	(b)	+2		(b)	+1		(b)	+2		(b)	-1		(b)	0
	(c)	0		(c)	-2		(c)	-3		(c)	-4		(c)	-3
	(d)	-4		(d)	-3		(d)	-4					(d)	-4

16	(a)	+4	**17**	(a)	+3	**18**	(a)	+3	**19**	(a)	+3	**20**	(a)	+1
	(b)	+3		(b)	+1		(b)	+1		(b)	+3		(b)	-1

	(c)	+1		(c)	-3		(c)	-3		(c)	+1		(c)	-2		
	(d)	-3								(d)	-3		(d)	-3		
	(e)	-3											(e)	-4		
21	(a)	+3	**22**	(a)	+3	**23**	(a)	+2	**24**	(a)	+3	**25**	(a)	+3		
	(b)	+2		(b)	+1		(b)	0		(b)	+2		(b)	0		
	(c)	-1		(c)	+1		(c)	-1		(c)	+1		(c)	-2		
	(d)	-3		(d)	-2		(d)	-4		(d)	-1		(d)	-3		
				(e)	-4											
26	(a)	+4	**27**	(a)	+4											
	(b)	0		(b)	+2											
	(c)	-3		(c)	-4											

Score: _____ - _____ = _____

(total of + answers) (total of - answers)

Example: (total + answers)=50; (total – answers)= 34; Score=16

Scoring

65-82:	Excellent
42-64:	Very good
28-41:	Good
-16-27:	Fair
Below -16:	Get help!

Source: Center for Science in the Public Interest 1996

Name_____

Date_____ **Date of birth**_____ **Section** _____

Gender:	**Male**	
	Female	

Checklist B - Identify your Physical Activity Level

Instructions: Keep the quiz as incentive. The quiz will be repeated on the 1st week, 19th week and 36th week.

Calculate Your Activity Index

1. Frequency: How often do you exercise?

If you exercise:	Your frequency score is:
Less than 1 time a week	0
1 time a week	1
2 times a week	2

3 times a week	3
4 times a week	4
5 or more times a week	5

2. Duration: How long do you exercise?

If each session continues for:	Your duration score is:
Less than 5 minutes	0
5 to 14 minutes	1
15 to 29 minutes	2
30 to 44 minutes	3
45 to 59 minutes	4
60 minutes or more	5

3. Intensity: How hard do you exercise?

If exercise results in:	Your intensity score is:
No change in pulse from resting level	0
Little change in pulse from resting level (slow walking, bowling, yoga)	1
Slight increase in pulse and breathing (table tennis, active golf with no golf cart)	2
Moderate increase in pulse and breathing (leisurely bicycling, easy continuous swimming, rapid walking)	3
Intermittent heavy breathing and sweating (tennis singles, basketball, squash)	4
Sustained heavy breathing and sweating (jogging, cross-country skiing, rope skipping)	5

To calculate your activity index, we'll multiply your three scores:

Frequency	x Duration	x Intensity	= Activity index

To assess your activity index, refer to the following table:

If your activity index is:	Your estimated level of activity is:
Less than 15	Sedentary
15-24	Low active
25-40	Moderate active
41-60	Active
Over 60	High active

If your activity level is in one of the lower categories, review the components of your score (frequency, duration, intensity) to see how you can raise your score. Add to your current exercise program or devise a new one.

Source: Kusinitz & Fine 1995

Name_____

Date_____ **Date of birth**_____ **Section** _____

Gender:

Male	
Female	

Checklist C-What Influences Eating Behaviour?

Instructions: Keep the quiz as incentive. The quiz will be repeated on the 1st week, 19th week and 36th week.

This test is designed to provide you with a score for five factors that describe many people's eating bahaviour. This information will put you in a better position to manage your eating behaviour and control your weight. Select the number that indicates to what degree each situation is likely to make you start eating.

Social	**Very Unlikely**									**Very Likely**
1. Arguing or having a conflict with someone	1	2	3	4	5	6	7	8	9	10
2. Being with others when they are eating while not eating	1	2	3	4	5	6	7	8	9	10

3. Being urged to eat by someone else	1	2	3	4	5	6	7	8	9	10
4. Feeling inadequate around others	1	2	3	4	5	6	7	8	9	10
Emotional										
5. Feeling bad, such as being anxious or depressed	1	2	3	4	5	6	7	8	9	10
6. Feeling good, happy, or relaxed	1	2	3	4	5	6	7	8	9	10
7. Feeling bored or having time on my hands	1	2	3	4	5	6	7	8	9	10
8. Feeling stressed or excited	1	2	3	4	5	6	7	8	9	10
Situational										
9. Seeing an advertisement for food or eating and wanting to eat	1	2	3	4	5	6	7	8	9	10
10. Passing by a bakery, cookie shop, or other enticement to eat	1	2	3	4	5	6	7	8	9	10
11. Being involved in a party, celebration, or special occasion	1	2	3	4	5	6	7	8	9	10
12. Eating out	1	2	3	4	5	6	7	8	9	10
Thinking										
13. Making excuses to myself about why it's OK to eat	1	2	3	4	5	6	7	8	9	10
14. Berating myself for being so fat or unable to control my eating	1	2	3	4	5	6	7	8	9	10
15. Worrying about others or about difficulties I am having	1	2	3	4	5	6	7	8	9	10
16. Thinking about how things should or shouldn't be	1	2	3	4	5	6	7	8	9	10
Physiological										
17. Experiencing pain or physical	1	2	3	4	5	6	7	8	9	10

discomfort										
18. Experiencing trembling, headache, or light headedness associated with no eating or too much caffeine	1	2	3	4	5	6	7	8	9	10
19. Experiencing fatigue or feeling overtired	1	2	3	4	5	6	7	8	9	10
20. Experiencing hunger pangs or urges to eat, even though I've eaten recently	1	2	3	4	5	6	7	8	9	10

Scoring

Below are your scores for each category. Focus on the highest ranked categories first, but any score above 24 is high and indicates that you need to work on that category.

Category	**Total Score**	**Rank Order**
Social (Items 1-4)		
Emotional (Items 5-8)		
Situational (Items 9-12)		
Thinking (Items 13-16)		
Physiological (Items 17-20)		

What Your Score Means

Social A high score here means you are very susceptible to the influence of others. Work on better ways to communicate more assertively, handle conflict, and manage anger. Challenge your beliefs about the need to be polite and the obligations you feel you must fulfill.

Emotional A high score here means you need to develop effective ways to cope with emotions. Work on developing skills in stress management, time management, and communication. Practicing positive but realistic self-talk can help you handle small daily upsets.

Situational A high score here means you are especially susceptible to external influences. Try to avoid external cues to eat and respond differently to those you cannot avoid. Control your environment by changing the way you buy, store, cook, and serve food. Anticipate potential problems, and have a plan for handling them.

Thinking A high score here means that the way you think--how you talk to yourself, the beliefs you hold, your memories, and your expectations--have a powerful influence on your eating habits. Try to be less self-critical, less perfectionistic, and more flexible in your ideas about the way things ought to be. Recognize when you're making excuses or rationalizations that allow you to eat.

Physiological A high score here means that the way you eat, what you eat, or medications you are taking may be affecting your eating behaviour. You may be eating to reduce physical arousal or deal with physical discomfort. Try eating three meals a day, supplemented with regular snacks if needed. Avoid too much caffeine. If any medication you're taking produces adverse physical reactions, switch to an alternative, if possible. If your medications may be affecting your hormone levels, discuss possible alternatives with your physician.

Source: Nash 1997

Name_____

Date_____ **Date of birth**_____ **Section** _____

Gender:

Male	
Female	

Checklist D- What influences the Physical Activity?

Instructions:

(a) Answer YES (Y) or NO (N) to the following statements.
(b) Number in order the first three according to your influences
(c) Keep the quiz as incentive. The quiz will be repeated on the 1st week, 19th week and 36th week.

(A)

1. "No time in my busy schedule." ___
2. No Energy — "I'm too tired" — Lack of discipline — "Too hard... there's got to be an easier way!"
3. Discouraging — Not enjoyable — Bad experience with Delayed Onset of Muscle Soreness (DOMS)
4. Expense of equipment, clothes, membership
5. Distance — Inconvenience
6. "Boredom" — Lack of variety

7. Injury/Health Problems — Chronic Physcial Discomfort
8. Embarassment — Social Discomfort
9. Lack of understanding of the benefits — "Low Priority"
10. Apathy — "Don't care to"
11. Weather conditions.____

(B) Put the above statements in order (only the first three): (a) _____, (b) _____, (c)_____

Scoring

If you have answer :

<3 YES	not bad
4-5 YES	poor motivation
6-8 YES	very poor motivation
9-11 YES	Get help

Source CDC Division of Nutrition and Physical Activity 1999

Middlesex University

Doctorate in Professional Studies Programme

Consent Form

48 Themistokli Dervi Str., Off. 207

Athienitis Centennial Bldg,

1066 Nicosia-Cyprus

tel: 00357 22 452288,

e-mail: aeleni@spidernet.com.cy

File Number:

Date of Receipt:

The following headings will be used in the Research Consent Form(s) to ensure that all relevant information is clearly conveyed to research subjects. Consent forms should be translated where it is relevant to particular communities.

Title of Research Project:

"The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Total Lifestyle Changes for Adults in Cyprus"

Investigator(s):

Eleni P Andreou, tel.:+35799464040, Christiana M Philippou, tel.: +35799497959

Purpose of the Research:

The research proposal aims to develop a behavioural approach for the treatment of obesity adjusted to the needs of the Cypriots adult population. The ultimate goal is the reduction of the obesity epidemic in Cyprus and being in conjunction with the goals set by the European Health Congress to decrease the incidence of obesity by 2010 by 20 %.

Description of the Research:

With the proposed study, it will be calculated the rates of obesity (Body Mass Index >30) and overweight(BMI>25) for adults aged 18-51 years of age based on parameters as BMI, weight, height, waist circumference , fat measurement, and sex in randomly

selected clientele of the two investigators. Particular emphasis will be given to the dietary habits and activity level. The duration of the proposed research is 18 weeks.

The participants will meet with the investigators six times bi-weekly and they will be reassessed in six weeks after the end of the 12 weeks period.

Research Days- the following activities will be done

- Personal data and blood pressure measurement
- Blood collection (fasting) by registered chemist
- Height, waist circumference measurements
- Weight, electrical impedance fat % measurement
- Questionnaire (physical activity, health condition, medical history, nutritional habits)
- Participation in individual consultation sessions for behaviour modification and support Groups

Aims and Objectives

- Determine the percentage of obesity in Cyprus
- Determine the percentage of overweight in Cyprus
- Collect information on the nutritional habits of Cypriots
- Collect information on level of physical activity of Cypriots
- Obtain information on biochemical indicators
- Investigate correlations between nutritional habits, level of physical activity and biochemical indicators
- Develop and Implement behaviour modification techniques for the achievement and maintenance of healthy weight and physical level.
- Prepare a Set of Nutritional Guidelines for the Cypriot Population

The initial consultation session as well as the group sessions will last one hour and the follow up sessions will be 20-30 minutes each.

The research will be a type of non invasive therapy for weight management and behaviour modification to maintain the healthy weight.

The blood test will be taken the by a registered chemist the first day of the research period and the participants are required to proceed at the investigators office without any food or drinks for 12 hours prior the lab test. When blood will be taken, there is a possibility of bruising or swelling while giving blood, or some other discomforts at the site where blood is drawn and that there may be minimal chance of infection, that these discomforts are brief and transient.

At the same day the fat measurement with the method of bioelectrical impedance will be done (no food or drinks or exercise for 12 hours is required). Nutritious breakfast will be offered afterwards.

If the subject is receiving any therapy prior to enrollment in the study and this therapy will or may be altered or discontinued as a result of participation in the study, this must be explained.

If changes are made to the study or new information becomes available, you will be informed.

If future use of the research data beyond the current study is anticipated, the participants will be notified. The research data/samples are to be destroyed after the study is complete.

The participants have a choice of not answering any questions or withdrawing at any time.

The study involves taking photographs, videotaping or sound recordings but they are not going to be presented anywhere without the permission of the participants.

Potential Harm, Injuries, Discomforts or Inconvenience:

There is no known harm associated with participation in this study. However laboratory tests will be done by a certified chemist and there is a possibility of bruising or swelling while giving blood, or some other discomforts at the site where blood is drawn and that there may be minimal chance of infection, that these discomforts are brief and transient

Potential Benefits:

You will directly benefit from participating in this study:

1. Complete laboratory profile will be done for the purposes of the study with no financial obligation
2. Anthropometric measurements, nutritional assessment and provision of individual nutrition plan
3. Physical activity assessment and provision of basic guidelines for individual exercise plan
4. Provision of individual and group therapy as part of the behavioural modification techniques

The outcomes of the study will benefit the general population in Cyprus as a behavioural modification guidelines and protocol will be developed for the ultimate goal of and effective an long lasting weight management programmes.

Confidentiality:

Confidentiality and anonymity will be respected and no information that discloses the identity of the subject will be released or published without consent unless required by

law. This legal obligation includes a number of circumstances, such as suspected child abuse and infectious disease, expression of suicidal ideas where research documents are ordered to be produced by a court of law and where researchers are obliged to report to the appropriate authorities. Any subject is able to leave the study at any point he/she feels necessary.

Participation:

If there are parts of the research study in which a research subject could choose not to participate this should be clearly explained.

Participation in research is voluntary. If you choose to participate in this study you can withdraw at any time.

Subjects will be given a copy of the consent form to keep.

Waiver of Rights:

Investigators are prohibited from seeking or obtaining waivers of subject's legal rights.

Contact:

If you have any questions about this study, please contact:

- Eleni P Andreou, +35799464040, aeleni@spidernet.com.cy
- Christiana M Philippou, +35799497959, evelina@cytanet.com.cy

If you have questions about your rights as a research participant, you may contact:

Eleni P Andreou, +35799464040, aeleni@spidernet.com.cy

Christiana M Philippou, +35799497959, evelina@cytanet.com.cy

CONSENT:

"By signing this form, I agree that:

- The study has been explained to me. Yes - No
- All my questions were answered. Yes - No
- Possible harm and discomforts and possible benefits (if any) of this study have been explained to me. Yes - No
- I understand that I have the right not to participate and the right to stop at any time. Yes - No
- I understand that I may refuse to participate without consequence to continuing medical care. The only very slight risk to me is that there might be the possibility of bruising or swelling while giving blood or some other discomforts at the site where blood is drawn and that there may be minimal chance of infection. These discomforts are brief and transient. Yes - No
- I have a choice of not answering any specific questions. Yes - No
- I am free now, and in the future, to ask any questions about the study. Yes - No
- I have been told that my personal information will be kept confidential. Yes - No
- I understand that no information that would identify me, will be released or printed without asking me first." Yes - No
- I understand that I will receive a signed copy of this consent form. Yes - No

I hereby consent to participate.,

Signature,

Date,

Name of Participant and Age:

Telephone number:

Name of person who obtained consent:,

Signature,

Date

This is to certify that I, …….(subject's name), agree to participate as a volunteer in a scientific investigation as part of the nutrition research programme of ……(name of institution) under the supervision of ……

The investigation and my part in the investigation have been defined and fully explained to me by …….., and I understand his/her explanation. A copy of the procedures of this investigation and a description of any risks and discomforts have been provided to me and have been discussed in detail with me.

I have been given an opportunity to ask whatever questions I have had, and all such questions have been answered satisfactorily.

I understand that I am free to deny any answers to specific items or questions in interviews or questionnaires.

I understand than any data or answers to questions will remain confidential with regard to my identity.

I understand that in the event of physical injury resulting from this investigation, neither financial compensation nor free medical treatment is provided for such a physical injury, and that further information on this policy is available from ……

I certify that, to the best of my knowledge and belief, I have no physical or mental illness or limitations that would increase the risk to me of participation in this investigation.

I further understand that I am free to withdraw my consent and terminate my participation at any time.

_____	_____
Date	Subject's Signature
_____	_____
Date	Subject's Signature
_____	_____
Date	Subject's Signature
_____	_____
Date	Subject's Signature

.....

CONSENT FORM

For Participation in a Research Study

(These documents consist of …….. pages)

You are requested to participate in a research program. Below (please see **"Information for Patients and/or Volunteers"**) you will be provided with all the details and explanations, in simple language, regarding your participation in the study and what may happen to you, if you agree to participate. All the dangers concerning your health and rights, resulting from your participation in the study, will be explained to you in full detail. In addition, you will be warned for any possible discomfort that you may suffer. You will be informed on the information and/or material that you will be asked to provide voluntarily for the study and who will have access to this information and material. The duration, for which the investigators will have access to the information and/or material that you will provide, will be specified to you. The aims of the study, will be explained and what is hoped to be achieved as a result of your participation. Also, the benefits of the investigators and the financial sponsors, that may result from the study, will be outlined. **You should not consent to participate in the study should you have any doubts concerning the study and your health and rights. You should not consent to participate if the study if you find it unclear.** Should you decide to participate, you must provide information and details on whether you participated in any other research study within the last 12 months. Furthermore, if you decide to participate and you are a patient, your treatment will not be altered nor affected by your decision. **You are free to withdraw from the study at any time you wish.** If you are a patient, your decision to withdraw from the study, will have absolutely no repercussions on your present or future treatment. If you participate in the study, you are free to file substantiated complaints on any aspect or against any investigator of the study. These complaints may be filed/reported to the Ethics Committee that approved the study or directly to the Cyprus National Bioethics Committee.

All the pages of these consent documents should bare your name and signature.

Short title of the Program you are asked to participate
The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Total Life Style Changes for Adults in Cyprus
Principal Investigator of the Program you are asked to participate
Eleni P. Andreou Christiana M. Philippou

Last name:	……	First name:	……..
Signature:		Date:	

.....

CONSENT FORM For Participation in a Research Study (These documents consist of …….. pages)
Short title of the Program you are asked to participate
The Use and Effectiveness of Behavioural Modification Techniques in Achieving and Maintaining Normal Weight and Fitness – The Total Life Style Changes for Adults in Cyprus

Are you providing consent for yourself or someone else?	
If you are providing consent for someone else give details and his/her name.	

Question	Yes or No
Did you complete the consent documents your self?	
Within the last 12 months, did you participate in any other research study?	
Did you read and fully understand the information provided regarding the Study?	
Did you have a chance to ask questions you may have regarding the Study?	

Did you receive adequate answers and explanations to your questions?	
Do you understand that you can withdraw from the study at any time you wish?	
Do you understand that, should you withdraw from the study you do not have to provide any explanation for your decision to any one?	
Do you understand that, should you withdraw from the study there will be no consequences on possible therapeutic treatment you are receiving or may receive in the future?	
Do you agree to participate in the Study ?	
With whom did you meet and discuss the study?	

Last name:	……	First name:	……..
Signature:		Date:	

……

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PART III

Middlesex University

Doctorate in Professional Studies Programme

Protocol and Guidelines for professional users for weight management for adults: assessment, categorization, therapy/follow up of overweight and obesity

By

Eleni P. Andreou **Christiana M. Philippou**